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The Canadian Medical Association Journal

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FOREWORD

WITH the present issue, the Canadian Medical Association Journal is entering on a new phase of its history. Apart from assuming a new dress, and, we trust, a more attractive form, its scope is intended to become more than ever Dominion-wide in interest and national in significance.

For the first time, the concerted efforts of all the provinces have been directed towards the maintenance of a single national journal, which shall become the expression of Canadian medical thought, and shall voice the best that the members of our profession have to give.

It is now nearly a hundred years since the *Journal Médicale de Quebec*, published in French and English by Xavier Tessier, marked the inception of medical journalism in this country. This was followed after a very ephemeral existence by the *Montreal Medical Gazette*, in 1844, and a few years later by the *Upper Canada Journal of Medical and Physical Sciences.*

Since these early days, nearly a score of local journals have come and gone,—all worthy efforts on the part of a few enthusiastic and unselfish practitioners to raise the standard of medical thought throughout the land.

Various more or less successful local efforts finally culminated in the issue of an official organ of the Canadian Medical Association, which during ten years has struggled bravely and successfully enough, though without attaining that wide-spread support and assistance to which a national organ is entitled.

And so we come to the present plan, the result of a universal effort on the part of representatives from all over the Dominion to found a single Canadian journal that shall redound to the credit of our profession; one that shall guide medical thought and legislation, promote better understanding between the public and the profession, and create the highest possible medical standards and ideals.

With every province in joint-partnership, with an accession of interest due to the enthusiasm of representatives from east and west, and with the determination on the part of every one to obliterate local interests in favor of a great national organization, there can be little doubt as to the success of this enterprise.

The Ontario Medical Association has been especially prominent in its co-operation to bring about the present change. The whole power of their provincial organization has been devoted to the success of one national Canadian journal. Their strong and well-organized editorial board has united to aid the scheme, and has afforded an example worthy of emulation by the whole Dominion.

Each other province has already intimated a desire to co-operate; sub-editorial boards have been formed so that provincial interests may be served, as well as those of the country at large.

The Editorial Boards, however, cannot maintain a successful journal unaided. They ask at once allegiance from every practitioner in the Dominion. They beg that not only shall every practitioner become a subscriber, but that the columns of the Journal may receive worthy and interesting contributions from every corner of the country. Under such conditions it should not be difficult to interest the members of the profession at large, and enable them to keep abreast of medical literature and current news in general.

In this way, and in this way alone, can the Editorial Board furnish a journal which will ultimately respond to the legitimate expectations of all concerned.

INTERIM REPORT OF REORGANIZATION COMMITTEE

AT the last meeting of the Canadian Medical Association in Vancouver a Committee on Reorganization was appointed to report to the meeting at Halifax next summer. This Committee, which consists of one representative from each province, has already done excellent work and hopes to more than justify its appointment before the next Annual Meeting.

Following are some of the guiding principles which have been adopted by the Committee:

(1) It is obvious that we must have a strong Canadian Medical Association, working along the lines of the American Medical Association, if we are to advance our interests as a profession.

(2) To this end a much increased membership must be obtained, not only because money is required to reorganize the Association, but also, above all, in order that the interest of the individual members of the profession should be enlisted in their own National Association.

(3) The Journal of the Association must be truly Dominion wide in scope and influence and to this end an Editorial Committee must be established in each province, whose duty it shall be to secure each month scientific and practical papers that shall be of real help to the busy practitioners. A very strong Editorial Committee has already been established in Ontario.

(4) Our Journal has also another duty to perform, namely, to watch closely any legislation bearing upon the profession; to see that charlatans, under whatever name they may class themselves, are thoroughly exposed and thus prevented from exploiting the public and hazarding the lives of the ignorant and unsuspecting.

(5) Our Association must also be very much alive to its obligations to the public. A committee must be appointed whose duty it shall be to carry on propaganda in the daily press, whereby the laity may be instructed on certain vital points which are elementary to us but which are strangely unknown to the public. I refer to such things for example as infant feeding, the neglect of post-menopause uterine hæmorrhage, the use of cathartics in acute abdominal conditions and a score of other points, which, if properly understood by the public, would save many a life and make the work of the physician and surgeon easier and more successful.

(6) A single fee should, in our opinion, cover membership in both the Provincial Medical Association and Canadian Medical Association. What the fee should be and how apportioned is a matter for consideration.

Geo. A. Bingham

Chairman.

THE ONTARIO MEDICAL ASSOCIATION ENTERS INTO ACTIVE PARTICIPATION IN THE JOURNAL OF THE CANADIAN MEDICAL ASSOCIATION

ON behalf of the Executive Committee of the Ontario Medical Association, we have much pleasure in announcing to our members, and to the profession generally throughout the whole of Canada, that we have gladly accepted the opportunity offered by the Executive Committee of the Canadian Medical Association, to unite with them and the officers of the various Provincial Associations to assist in the development of a National Medical Journal, representative of the whole Dominion.

As we understand it, this undertaking is merely an enlargement of the privileges which we have enjoyed for several years under the terms of our affiliation with the parent Association.

The various steps leading up to the elaboration of this policy will be gladly presented to any one who is particularly interested and undoubtedly will have been discussed thoroughly in general session of our Association before this announcement reaches you.

Briefly, may we state that it was impossible to complete satisfactory arrangements with the publishers of the *Canadian Medical Monthly* according to the instructions given the Executive Committee at the last general meeting.

We believe that the National Journal offers an excellent medium for communication from our Executive Committee to the members whereby we can keep them constantly in touch with the developments of our organization, both in so far as it affects ourselves and the community at large, whom we hope more efficiently to serve.

Our participation in a real Canadian Journal, including in its pages the best efforts in scientific medicine of the profession, undoubtedly will be a great stimulus to our progress as a live provincial organization and a strong integral part of the Canadian Medical Association.

The present policy of the Ontario Medical Association has largely to do with the stimulating of general interest in all that is best in modern medicine. We hope to carry our plan of post-graduate education into every local unit, and by means of literature of the day and frequent meetings of these local units, to assist in the development of a higher type of medical practitioner. . . . The public unquestionably should be protected against the "quack" and the incompetent, including any who may be found within our own ranks.

The Executive Committee has appointed a strong Editorial Board, which has signified willingness to undertake the literary effort on behalf of the Association.

We commend these gentlemen to you and earnestly request your complete co-operation with them.

Submitted on behalf of the Executive Committee of the Ontario Medical Association.

J Heurner Mullin

President.

THE REORGANIZATION OF THE JOURNAL OF THE CANADIAN MEDICAL ASSOCIATION

THE question of putting before the medical profession of Canada a journal which shall be comprehensive, and inclusive of details of general and local interest has occupied the minds of the editorial board of the Journal of the Canadian Medical Association for some time. It was felt that too much dependence upon foreign medical journals for certain details was slowly but surely enticing Canadian readers of medical matters to the great detriment of our own productions. It was further felt that a united support of the Canadian journal which has worked hard and long to keep up a proper Canadian standard was something to be properly cultivated; with real foresight they have appealed to the provinces to take a share in creating what we hope will develop into a representative and satisfying medical journal, one in which Canadians will prefer to see appear the products of their hands and heads, and one in which they can readily look for discussion and dissection of current activities in medical and surgical lines and for the detailing of matters pertaining to the profession at large or even to their own districts.

In pursuance of this idea provincial boards of editors have been organized, whose business it shall be to contribute a provincial section to the Journal, all matters from a province coming through their hands and appearing as a contained unit in each issue; Ontario, as having more than half of the English speaking physicians of Canada within her borders will naturally be entitled to a share of the journal matter proportionate to this number; with the planned increase in size of the issue there should be no difficulty in finding place for the contributions of each province as they arrange and organize their machinery.

The Ontario organization, ready to take up work with the MacMillan Company in issuing for the Ontario Medical Association an official journal, becomes the contributing body from this province, the above mentioned company being unwilling to proceed further with the plan discussed and adopted at the May meeting; into their hands, as board of editors, will now go all contributions from Ontario, and upon them devolves the duty of filling properly the Ontario section of the new issues.

In discussing the whole matter it might be briefly said that it seems an excellent opportunity to employ our editorial machinery in what must be recognized as an attempt to realize some co-ordination in producing a national medical journal of standing. Such a journal must be in existence in Canada if we are to claim the recognition in the world's medical circles which we desire and with the body of workers and students now developing in our country it cannot be long before there will be crying need for others, perhaps of a more distinctly provincial nature.

Norman B. Gwyn

Chairman, Editorial Board, Ontario Medical Association

AN INTERPRETATION OF SOME GASTRO-INTESTINAL SYMPTOMS

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In what must necessarily be a very short sketch of the interpretations that can be placed upon some of the symptoms commonly associated with gastro-intestinal disease, it is necessary to rapidly review the development of the gastro-intestinal tract. The gastro-intestinal tract develops from two ingrowths of associated epiblast and nerve cells. The anterior one arises from the pouch just back of the last gill arch. This grows backward to the region of the tenth dorsal somatic area, there to join with the corresponding ingrowth of epiblast and nerve cells which arise posteriorly in the sacral region. These epiblastic ingrowths are originally derived from the appendages of the anterior and posterior somatic areas and are accompanied by those displaced motor nerve cells which are known as the bulbar and sacral outflows of the autonomic system; accompanying these there are sensory nerve fibres whose nerve cells remain within the central nervous system. In the early stage of this development when these ingrowths are passing backward or forward through the embryo, they do not seem to come into intimate relationship with the structures of the somatic areas through which they pass, but later in their development to become fully functioning structures they incorporate supporting structures (that is, the connective tissue cells) and the nerve fibrils supplying these supporting structures from the somatic areas in which they are lying when this secondary development into adult stage is taking place, and during this development there penetrates into the tissue of the tract and between the cells, the blood vessels and their corresponding nerve supply derived from the thoracic lumbar autonomic outflow, namely the sympathetic system under the old nomenclature. Thus, the gastro-intestinal tract has two motor nerve cell supplies; first, those coming from the bulbar and sacral autonomic outflows which accompany the original epiblastic ingrowths; second, the motor nerve cells derived from the thoracic-lumbar autonomic outflow controlling the blood vessels and certain smooth muscle fibres associated with these; the latter muscle cells become incorporated with the original gastrointestinal ingrowths, but only a few remnants are left in the adult, namely, the sphincter muscles at the ileocæcal valve, the internal anal sphincter, that of the bladder, and possibly there are fibres incorporated in the pylorus, and at the junction of the cæcal colon with the colon proper. These two groups of motor cells are far displaced from the original central nervous system and lie on or within the walls of the gastro-intestinal

Fig I.

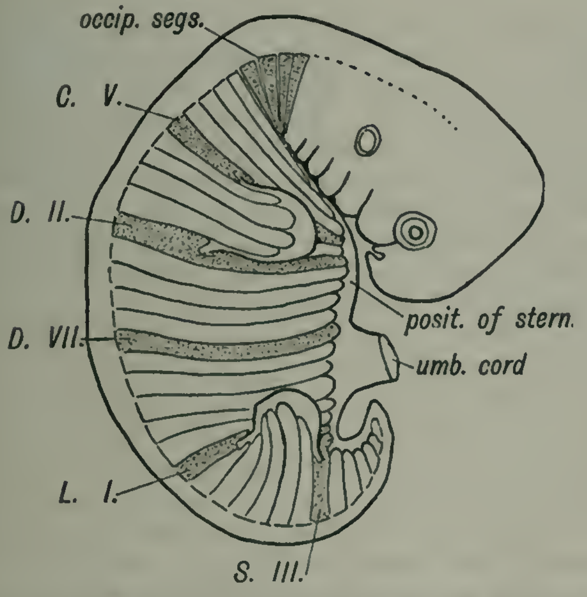

Fig. 392.—Diagram of a Human Embryo (5th week) showing the arrangement and Extension of the Mesoblastic Segments. (After A. M. Paterson.) The first and last of each segment entering into the formation of the limbs is stippled. The position is indicated in which the sternum is formed.

(*From Keith's "Human Embryology and Morphology"*)

Fig. II.

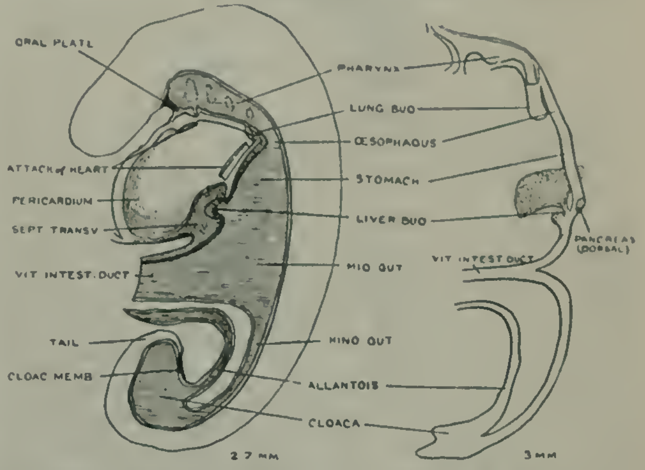

Fig. 236.—The Alimentary System of a Human Embryo 2·5 mm. long, and near the commencement of the 3rd week of development. (Professor Peter Thompson.)

Fig. 237.—The Alimentary System of a Human Embryo 3 mm. long, and about the end of the 3rd week of development (After Professor Broman.)

(*From Keith's "Human Embryology and Morphology".*)

tract in the case of the bulbar and sacraloutflows, or inganglia in the case of the thoracic lumbar outflow.

Fig. III.

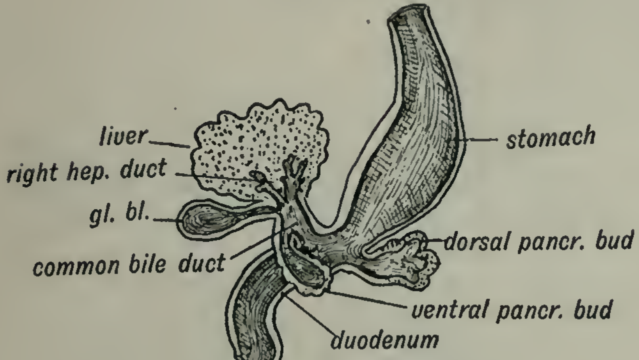

Fig. 253.—The Pancreatic and Hepatic Processes of a 4th week Human Embryo. (After Kollmann.)
(From Keith's "Human Embryology and Morphology.")

There are apparently three sources from which the sensory nerve fibres are derived, all the nerve cells of which remain within the central nervous system, including the posterior root ganglia. First, those fibrils which accompany the original ingrowths: Second, those which accompany the blood vessels and are associated with the thoracic lumbar autonomic system: Third, those derived from the somatic areas which provide supporting structures to the specialized and fully developed secondary outgrowths of the gastro-intestinal tract.

Fig. IV.

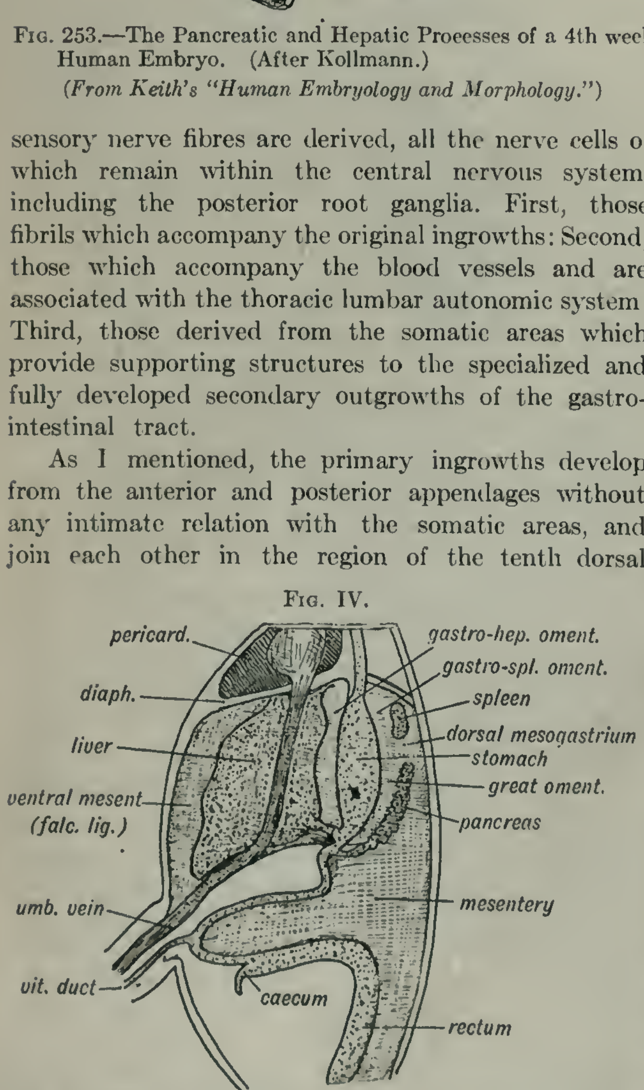

Fig. 251.—The Relationship of the Spleen, Pancreas and Liver to the Mesogastrium in the Embryo.
(From Keith's "Human Embryology and Morphology.")

As I mentioned, the primary ingrowths develop from the anterior and posterior appendages without any intimate relation with the somatic areas, and join each other in the region of the tenth dorsal somatic area; before the secondary development takes place the great growth in length gives rise to an "S" like curve in the anterior ingrowth, the upper part of which passes to the left in the region of the fifth dorsal somatic area, crosses the mid line to the right about the seventh or eighth dorsal and recrosses the middle line from right to left in the region of the tenth dorsal, passing upwards frequently as high as the seventh and eighth left dorsal, terminating at this point in the cæcum. It is from the lowest point of this latter curve that the earliest of the secondary developments take place; that is, the vitelline duct whose relation to the tenth dorsal somatic area is made evident by its passage through the abdominal wall at the umbilicus. A remnant of the vitelline duct is Meckel's diverticulum, which is occasionally found situated about eighteen inches from the ileo cæcal valve.

From the above one sees that from the lower end of the esophagus to the cæcum, the gastrointestinal tract, with all the important outgrowths of it, get their full development in the region included between the fifth and the tenth dorsal somatic areas, while the "S" like curve of this early development determines whether the somatic nerve connections be on the left or right side. The lower end of the œsophagus is developed near the middle line. The stomach mainly develops on the left from the sixth to the eighth segments. The outgrowth, which becomes the gall bladder and liver develops dorsally, and grows out to the right, so that the liver obtains its supporting elements from the eighth and ninth dorsal segments and from that abberant muscle, the diaphragm, which originally developed in and has its innervation from the fourth and fifth cervical somatic areas. The gall bladder, less extensive in its growth, develops near the middle line, obtaining its structural support from near the mid line of the right ninth and tenth somatic areas. The small intestine has an extremely rapid development in length much removed from the tenth dorsal somatic area in which it originally developed, while the lower part of the ileum, cæcum and appendix develop in the left ninth, eighth and seventh somatic areas. The final position of the fully developed and adult structures has no particular relation to the somatic areas in which they come to rest, the only connection with these apparently being that of their peritoneal covering.

You will note that it is a very short portion of the gastrointestinal tract from which the most important structures involved in digestion arise, being only that part which had relation to the seventh to tenth dorsal somatic areas, and it may be presumed that there must be a very close relationship in innervation and correlation of function of the structures from the pyloric antrum to the ileo cæcal valve. Also that there must be an intimate connection between these gastrointestinal structures whose origin was from the anterior appendages and those adult structures which have developed from the anterior appendages (or the gill arches); that is, all the mouth, pharynx and nose parts.

The physiologists, pathologists and clinicians have worked for a long time upon the question of sensation in the gastrointestinal tract. There seems to be no common sense of touch such as exists in the skin. The sensations of pain and discomfort mainly arise from sensory endings lying in relation to the muscle structures and receiving their stimuli either from spasm or acute stretch of these elements, but there is distress, soreness and tenderness which evidently is not related to the muscle, and these are always accompanied by a sensation of distress or pain set up in the somatic area in which the affected structure underwent fts secondary development.

With this necessarily short and rather dogmatic statement of the development of the gastrointestinal tract you may not be in complete agreement, but it will at least give some rough foundation in developing explanations of the signs and symptoms which arise in disorders of the gastrointestinal system.

I wish first to take up the symptoms of belching and regurgitation, calling your attention to the necessity of determining the exact period of functioning at which these occur. In the taking of food it requires a force equivalent to twenty-six centimetres of water to pass the first bolus through the guard muscle at the end of the œsophagus. Less force is required for the second bolus, and after a number have passed, the cardia becomes completely relaxed and the food passes readily into the stomach. It is not until some minutes after the meal has been finished that the cardia again contracts firmly.

During the period towards the end of the meal or immediately after the meal there may be a rush of air up the œsophagus. This type of belching is without effort, frequently involuntary and consequent upon the rapid swallowing of a large meal. Once it was looked upon as a sign of a hearty eater and as a compliment to the provider. It is not a sign of gastrointestinal disturbance; rather is it a sign of gluttony.

The regurgitation of "sweet" mouthfuls is of the same mechanism; that is, before the cardia contracts again material can readily escape from the stomach on the slightest increase of tension within the stomach or the abdomen. Regurgitation which occurs later when the hydrochloric acid is being secreted will be sour; and later still when digestion of protein has gone on to the formation of peptones and peptides the regurgitation will be bitter and scalding, giving rise to the well-known heartburn,even though the quantity of material may not be sufficient to reach the pharynx.

Belching which occurs some time after the meal is brought about by quite a different mechanism. At this stage, the stomach, which had been continuously relaxing during the process of eating now develops tonic contraction, and the cardia is tightly closed. If this tonic contraction becomes excessive, *i.e.*, hypertonic throughout, or if the patient is hypersensitive to moderate contraction, he has the sensation of acute distention, with or without the signs of bloating. There is usually no more air in the stomach than occurs normally. The patient seeks to gain relief from the distress of this acute tension. He swallows air, forces the cardia, increasing the distention of the stomach; then before the cardia can close down again he by voluntary contraction of the chest and abdomen forces out some of the air, leaving the stomach partially relaxed, but with no less, or very little less,content of air than before the manœuvre. Again the stomach contracts and increases the tension. Again the patient feels the distress and repeats the process.

The distress in the case of belching is not acute pain as a rule and is usually felt high in the intercostal angle and to the left, frequently with distress or tenderness in the left back. The heartburn is usually felt post-sternally, frequently with soreness in the back on the left side; but as a rule the majority of patients definitely locate it in the œsophagus if the material passes upwards beyond the lower two inches of the œsophagus.

In the majority of histories the writers are content with the terms "the appetite is poor", "the appetite is fair'', or "the appetite is good", usually leaving out the qualifying statements. The qualifying statements are absolutely necessary as there are many conditions which are classed under the term "loss of appetite". In the condition known as hunger the whole stomach wall is over contracted and most markedly so in the pyloric antrum, with some evidence of periodic peristaltic waves. The typical state of the stomach in normal *loss of appetite* is that the stomach is full to moderate tension and developing its normal peristaltic waves. Now, if for any reason there be marked relaxation of the muscles of the stomach, as in atony, and that from whatever cause, there will be a loss of appetite which is not distressing, and is merely the absence of hunger. On the other hand, the stomach may be over-contracted with the pyloric antrum contracted out of proportion to the rest of the stomach, and the patient complains of a "goneness, sinking and gnawing sensation", which they often describe as a "false hunger" or a "sickish hunger". This frequently occurs before meals in people who have continuous gastric secretion or who are in a state of anxiety or dread. As a rule the patient feels that he should eat, but the sight of food by increasing the tonus of the stomach, may give rise to waves to nausea. As the stomach in such cases usually refuses to relax as he swallows he feels filled and satisfied with a few mouthfuls. In both of the above conditions we know that the symptoms have a definite relation to the state of functioning of the musculature of the stomach, but this does not indicate any lesion of the stomach; usually it is brought about by a reflex stimulation from other portions of the gastrointestinal tract or by psychic influence.

Another form of loss of appetite occurs in the patient who is hungry, wishes to eat, but is afraid to eat because of the subsequent distress and pain.

The pain that patients complain of in the epigastrium soon after eating should be enquired into minutely, because distress and discomfort is so frequently complained of as pain. Actual pain arising from the stomach is only associated with first, acute local muscular spasm when the whole area becomes hyyertonic or when strong peristalis passes over the area such as so frequently occurs with ulcer, simple or malignant, which are deep enough to invade the muscle coat; or second, with violent spasm of the whole stomach, with or without reverse peristalsis; that is, actual pain is only associated with acute contraction or acute distention of the musculature. All ulcers do not give rise to pain. If the ulcer penetrates only the mucous membrane or if it has penetrated the muscular coat as far as the peritoneum, there is no marked irritation of the muscle, and consequently no spasm; hence no pain. If the ulcer be situated in that portion of the stomach, the cardia, where the muscle is not easily stimulated to violent local spasm and where peristaltic waves are very feeble, little or no pain is felt.

The pain arising from the stomach in the case of local disease of the stomach will occur when the stomach is at the height of muscular functioning; that is, when there is general contraction of the musculature with waves of peristalsis sweeping on to the pylorus, thus violently increasing the local spasm and the local tension. That is, the pain is never directly due to the irritation of nerve endings by the stomach content coming in contact with the ulcerated surface, but is due to the cramp or stretching of muscle, and will be present when the muscle is in active peristalsis and will subside as the peristalsis subsides. The same character of pain would develop if there is marked obstruction at the pylorus due to pyloric spasm or any mechanical blocking. Where this pain is due to local stomach lesion there is local tenderness with referred distress to the left, tenderness at the posterior branches on the left side in the region of the fifth, sixth, seventh and eighth dorsal roots; and there will be marked local pain and tenderness if the peritoneum has become actually inflamed.

The sense of nausea is associated with a marked spasm of the whole pyloric antrum with increased tension in the fundus and cardia, and no peristaltic waves can be noted. As the spasm at the pyloric antrum increases so does the sense of nausea. Then reverse peristalsis may set in and become violent, sweeping towards the cardia producing acute nausea, distress and pain, and with these all the general reactions with which you are familiar. Then suddenly the chest and abdominal walls contract violently, increasing the stomach tension so greatly that the cardia is forced and the act of vomiting accomplished. If this disturbance of the functioning of the stomach is the result of muscle spasm in other portions of the gastrointestinal or in associated organs, being purely a reflex from such an irritation, then the marked collapse and inhibition which follows the phenomenon of vomiting may relax such a spasm, and for a time the patient obtains ease, but if the irritation be due to other causes vomiting is not likely to give relief from the symptoms. (The sense of nausea can be produced during operation under local anæsthesia, when clamps compress the walls of the pyloric antrum.)

The pain which occurs in the epigastric region late after a meal when the stomach is empty or nearly empty is of the same type of pain that occurs in the spasm or stretch of any smooth muscle tissue, and the most characteristic type is that due to the spasm in connection with duodenal ulcer. The former speaker has described fully the functioning of the duodenum, and you can understand how tonus and peristalsis in this first portion of the duodenum are active towards the end of stomach digestion, but with the pain comes a sensation of entirely different origin. The irritation of the duodenum interferes with the normal functioning of the stomach, causing it to be hypertonically contracted with slight but active peristalsis, and producing a sense of hunger, so that the typical duodenal ulcer pain is spoken of as a hunger pain; that is, we not only have the symptoms of duodenal spasm but a special type of reflex in the stomach musculature which is associated with, if not the cause of hunger sensation.

Similarly, in gall bladder irritation we have symptoms arising directly from the gall bladder, and symptoms which develop because of a reflex disturbance in the muscular functioning of the stomach. The disturbance of the muscular functioning of the stomach due to gall bladder irritation is different from that arising from irritation of the duodenum. As a rule it is a hypertension of the whole musculature, without the excessive antrum contraction such as accompanies duodenal ulcer. The intragastric tension is greatly increased and the patient suffers from a sense of distress which he seeks to relieve by belching, but the irritation may become so great as to provoke the pyloric antrum to excessive contraction, even to setting up reverse peristalsis, giving rise to a sense of nausea which may go on to vomiting.

I would like to call your attention to one symptom in connection with gall bladder disease, and this is a sense of ravenous hunger which makes the patient feel like snatching at his food, and frequently he is hungry in a few minutes after his meal. In all cases where this symptom has been prominent operation has revealed that there was a gall stone lodged in the beginning of the cystic duct. Cholecystitis which merely involves the mucous membrane rarely produces gastric symptoms and very few localizing symptoms or signs, but as soon as the muscle is interfered with or there is an obstruction, gastric symptoms develop, and these symptoms may continue after removal of the gall bladder, apparently because of involvement of the wall of the ducts.

Physiologists and pathologists have not as yet thrown any light upon the interrelationship between the gall bladder and the colon, but from clinical experience one is left with the impression that some intimate relationship exists, for it is found that chronic gall bladder disease and the so-called mucous colitis are so frequently associated that any continued mucous excretion is looked upon as presumptive evidence that gall bladder disease exists. Some clinicians are inclined to believe that colitis is the primary factor and gall bladder disease the secondary, but in my experience a close examination of the history of the patient reveals evidence of gall bladder disease long before the occurence of the mucous colitis.

I would like to add a word of warning as to the significance of belching. One so often hears that belching is characteristic and diagnostic of gall bladder disease. Such a statement is misleading. While belching occurs in many cases of gall bladder disease there are many cases of gall bladder disease without belching and there are many cases of severe belching without any gall bladder disease.

Delay of the bowel content in the ileum caused by obstruction or by regurgitation from the cæcum gives rise to disturbed stomach function, spastic at first, atonic later, with loss of appetite. In the case of obstruction in the lower ileum the patient usually relishes his breakfast but has no appetite for his lunch or his evening meal. If the moon meal be omitted he will be hungry for his evening meal and eat heartily. The success that has attended this procedure is the probable origin of the two-meal cure.

In the case of long retention of the content in the ileum due to regurgitation the patient wakes in the morning with some lower abdominal distress and without any appetite for breakfast, but as the day goes on his discomfort decreases and he is able to take a moderate lunch. Sometime in the afternoon he develops a sense of wellbeing. In following such cases where barium has been given, this time corresponds to the complete emptying of the ileum.

In both cases the referred distress is in the upper left quandrant and in the left back.

The symptoms that arise in the case of appendicital irritation may be of three types. First, the symptoms arising from the reflexly disturbed function of the stomach which are felt in the epigastrium. Such are the symptoms with which an acute attack of appendicitis begins—epigastric pain, nausea and vomiting. Yet we may have in the more chronic cases distress felt in the left epigastrium and with tenderness over the posterior branches of the seventh, eighth, ninth and tenth left dorsal roots without any apparent disturbance of stomach functioning. These are probably due to the irritation of the endings of the nerve fibrils supplied by the somatic areas in which the appendix developed to adult type. The third set of symptoms in appendix condition are those which develop locally in the lower right quadrant and are due to involvement of the peritoneum in the neighbourhood.

In a general way, many of the signs and symptoms which arise from gastrointestinal disease are due to disturbance of muscular functioning of the stomach and hence must lead to a great deal of confusion if they are merely enumerated, but if they are definitely arranged with regard to the phases of gastro intestinal functioning the clue is soon obtained and it becomes possible to diagnose two or more different conditions existing in the same individual. Besides the symptoms of disturbed gastric function there are the localizing symptoms due to the reflexes which are produced in the somatic area in which the different portions of the gastrointestinal develop, and those due to the involvement of the peritoneum, by reason of inflammmation or adhesions that are the result of former inflamation. Thus, the distress that is felt about the right shoulder and the tenderness under the right costal cartilage with a reflex distress extending directly upwards is indicative of liver involvement, while in gall bladder disease the distress, soreness and pain is along the course of the eighth, ninth and tenth right dorsal nerves with local tenderness under the right costal margin closer to the middle line with referred distress to the left epigastrium and præcordium. Never does irritation of the gall bladder give rise to shoulder pain. If this shoulder pain does exist it is indicative of liver involvement.

No history of gastrointestinal disease can be complete without an accurate record of the disturbances in childhood. Vomiting attacks which cannot be ascribed to a definite cause and which are usually said to be due to the child having eaten something that had disagreed with him, are ninety-nine times out of one hundred due to appendicitis. The so-called bilious attacks not ushered in by the migraine type of headache are nearly always due to cholecystitis. A history of malaria in a non-malaria country or a history of intermittent fever is very common in cases who are evidently suffering from chronic gall bladder disease. Such children in their later teen's are usually free of all gastric disturbance, though frequently one gets the statement that they had to be careful of what they ate. Later they become subject to stomach trouble and indigestion. The history of the case should also include an exact description of the attack, its duration, the intervals between attacks, the exact timing of the symptoms with regard to gastrointestinal functioning, and whether the character of the attacks have changed materially. With an accurate history and a clear conception of the development, the interrelationship and the functioning of the different parts of the gastrointestinal tract, it is possible to arrive at an accurate diagnosis, not only of one condition but of two or three conditions existing in the same patient, and for all of this we have to thank not the clinician so much as the embryologist, the physiologist and the *x*-ray expert.

THE DIAGNOSIS OF GASTRIC ULCER

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PERHAPS no subject in clinical medicine arouses more practical interest than does the subject of gastric ulcer. The clinician striving for a diagnosis often finds the history difficult to unravel, the symptoms dubious, the physical signs uncertain and the chemical findings leave him more than ever in doubt. Nay more, one must confess that even surgical exploration not infrequently fails to elucidate the diagnosis. It must be admitted that there are many cases of gastric ulcer so small and so acute in their development that even to the surgical touch the diagnosis is not clear. Many of you who are here will remember seeing the surgeon striving in vain to find the ulcer which he felt sure from the history and physical signs must be an obvious one not only to the touch but to the naked eye.

So much have we been given to rely upon short cuts in diagnosis, that in many clinics the use of x-rays has been given a position of prime importance in the diagnosis. It is for this reason that it seems to me well worth while to open up a discussion as to the relative values of the means of diagnosis hitherto employed.

Our several means of diagnosis, taking them in the order in which they would be applied are the *history*, the *bed-side examination*, the *laboratory* tests and the rœntgenological examinations.

In a careful analysis of the cases on record at the Royal Victoria Hospital, Montreal, we have been very much struck with the fact that the history itself in many cases has afforded little, if any, satisfactory evidence of the presence of an ulcer. Many times the first indication has been a violent hæmatemesis, or perforation, where a record of any previous disturbances of the stomach has been wanting. At other times again, the diagnosis was made from the history of definite recurring pains with vomiting, and, indeed, the pains have even been localized, so much so that the diagnosis has seemed to be beyond any doubt. Here again, however, on not a few occasions surgical interference has revealed the error in diagnosis, while at other times when the operation was deferred, the patient has been seemingly cured without the usual procedure, which one regards as necessary for the healing of an ulcer.

As for the character of the *pain*, that, too, presents the widest variations in the history, and it can hardly be said that any pains are characteristic beyond that which is present in cases of hyperacidity—I mean by that the hunger-pains which are so frequently present where ulcer exists. In cholelithiasis, in neuroses, and in other conditions where irritation of the gastric mucosa is present, the pains may simulate the pains of gastric ulcer. In the hospital cases pain was complained of in all cases, but its character depended a great deal on the individual. In regard to the relation of pain to food, in about 60 per cent. of cases the pain was said to be worse *after* taking food. In 10 per cent. the pain was *before* food, but pain was also described as being *constant* or *not affected* by the taking of food.

A history of vomiting, although considered by most authors to be a very constant symptom, occurred in only about 50 per cent. of our cases. The vomitus was said to consist of food taken shortly before, but very little could be learned of its characteristics except when blood was present which happened in about 10 per cent.

The history gives us a clue and when there is hæmatemesis, or perforation, the diagnosis is more easy but these late complications are not so likely to happen when the patient is under observation and perhaps being kept at rest and on a light diet.

We have all seen cases of ptosis or of mucous colitis or chronic appendicitis where the history of pain and digestive disturbance differs in no way from that which we often get with gastrice ulcer. It is these cases which tax our means of diagnosis and makes it necessary to search for and exclude one by one the special signs of those different diseases.

In our cases the history was most often a long one of definite digestive derangements, very frequently with remissions but with little return to normal. *Pain* was in all cases insisted upon as being a constant symptom, and in a large percentage of cases there was a history of hæmatemesis more or less severe which by a process of exclusion would almost clinch the diagnosis.

The clinical examination of the patient gives us much valuable information, both for and against the diagnosis of gastric ulcer. *Tenderness* is a very constant sign and one on which stress should be laid. In our own cases it was present in practically all cases. It was nearly always well marked, worse on pressure and situated in the upper part of the abdomen and generally in the epigastrium. The degree of tenderness varied, as might be expected, with the patient but no report describes the tenderness as being confined to a small circumscribed area. These reports have mainly to do with public ward patients, many being more or less uneducated and unintelligent persons, but that this much insisted upon circumscribed tenderness did not appear at all is worthy of consideration.

Sir James MacKenzie in his book, "Symptoms and their Interpretation", says that the position of the ulcer determines the point of tenderness, which therefore is not a fixed point clinically, being situated more to the left or right according as the ulcer is at the cardia or pylorus. On the other hand, although a larger proportion of the cases reported were drawn from an unobservant class, Bassler of New York makes the statement, that only the more definite cases of gastric ulcer present themselves for treatment, a proportion which he estimates as about 25 per cent. of all cases.

With reference to the acidity, here, too, the greatest variations may exist, and while it has generally been accepted that hyperacidity is a fairly constant accompaniment to gastric ulcer, our own experience has shown that in many cases of ulcer, the acid may be normal, or even subnormal.

Much stress is laid by many authorities upon the presence of occult blood in the fæces, and it may be true that sufficient attention in the past has not been paid to these examinations. Nevertheless, experience has shown that where the findings are negative, it does not in any sense exclude the possibility of an ulcer, but only where it is a constant finding can one say with any assurance that it is a probable indication that ulcer exists. In our cases this examination gave little or no information.

As has already been said, more and more attention is being paid to the *barium meal and x-ray findings.* This method of examination has been carried out in almost every one of the hospital cases during the last ten years and has come to be regarded as the most important single method of examination we possess for arriving at a diagnosis. Too much insistence cannot be placed upon the importance of the screen examination as a preferential method over that of the skiagram. By examining for a sufficient length of time by means of the fluoroscope, particularly when this is combined with simultaneous palpation of the stomach, one may judge more readily the emptying time of the stomach, the type of peristalsis, the size, shape and position of the stomach and the duodenal cap.

Dr. Pirie, whose experience at the Royal Victoria Hospital and elsewhere has been unusual, emphasizes the fact that the acute gastric ulcer, as a rule, shows no rœntgenological changes. In the subacute and more chronic types, on the other hand, much information may be gained, but this depends, too, largely upon the anatomical lesions produced by the ulcer in its development.

The more one has to do with cases of gastric ulcer, the more is one convinced that no *one* of these methods alone can satisfy. Experience has taught that reliance upon any one means of diagnosis as pathognomonic is to be avoided, and that only by a careful study of all the conditions together, can one arrive at an approximately satisfactory conclusion.

How necessary it is to diagnose these conditions correctly is shown by the results of treatment. If under medication and dieting improvement does not take place, surgery must be resorted to and where the diagnosis is correct, gives brilliant results. On the other hand, as Sir Berkeley Moynihan in a paper entitled, "Disappointments after Gastro-Enterostomy", points out, many failures are due to the operation being done where there is no disease justifying it, such as appendicitis, cholelithiasis, cirrhosis of the liver, tabes, etc., and he concludes with the remark that done in appropriate cases there will be few disappointments. The relative importance of the different means we have of making a diagnosis is frequently not appreciated. The tendency is to lay undue stress on one or more of these methods. The clinical findings are often meagre and the chemical analysis indefinite and it is only by grouping these results together that they become valuable and help us.

In conclusion then, I would insist on, in addition to a careful clinical examination, the very great importance of a carefully taken and carefully sifted history. An account of the pain and its remissions, the vomiting and the bleeding, and of the long and progresivel downward course of the disease can often be drawn, at the expense of some time and much patience, from even the most unintelligent of cases, and when this story is considered with the rœntgenological findings, it will more often than not confirm us in our diagnosis.

DUODENAL ULCER

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A LITTLE over a century ago duodenal ulcer as a clinical entity was entirely unknown. Indeed less than thirty years ago as pointed out by Moynihan the symptoms of chronic duodenal ulcer had not been recognized with sufficient certainty to enable a diagnosis to be made. It is remarkable that a condition now so well known clinically and with such a definite pathology, should have been so long unrecognized, and though first described in 1830 by one of the great men of that time, John Abercrombie of Edinburgh, it should have passed for nearly a century with little recognition until its place in medical literature was fully established by Moynihan in his monogram on duodenal ulcer in 1910.

Clinical Course and Symptoms. The clinical course in most cases of duodenal ulcer is typical; in fact as the patient tells his own story the diagnosis is often made, but there are some exceptions to this well marked and characteristic story, and these exceptions offer the greatest difficulty in making a diagnosis. These will be dealt with more fully later. Abercrombie[1] from five cases collected from the literature (and this speaks well for medical records at that early period), made the following observations: "The leading peculiarity of disease of the duodenum, so far as we are at present acquainted with it, seems to be that the food is taken with relish, and the first stage of digestion is not impeded; but the pain begins about the time the food is passing out of the stomach or from two to four hours after the meal."

The complaint is usually one of "indigestion" or distress and discomfort in the stomach, and the history of the case usually dates back a long time.

At first the symptoms come on in "attacks" lasting for weeks or months, and usually in the spring and fall of the year. In the early stages between these attacks complete remission is the rule, but later the distress becomes more or less constant. The distress or pain comes on two hours or more after meals, and relief is often obtained by the taking of food or bicarbonate of soda. A glass of milk or a soda biscuit, or both, are apparently effective in producing this relief. The patient is well and comfortable after he has dined, but while good digestion waits on appetite health does not attend both. The time at which the pain comes on may be affected by complications. Thus it is said to come earlier than two hours after food if adhesions have formed to the anterior abdominal wall, or, if there is beginning stenosis. The patient is often awakened in the night with this pain and may take some food to obtain relief. Dr. Chas. Hunter tells of one man who kept a bag of biscuits at the head of his bed so that he could relieve the pain which came on in the night. The cause of this so-called "hunger" pain is often attributed to food passing over the ulcer, but *x*-ray examination has shown that food passes out of the stomach and over the ulcerated surface of the duodenum within the first few minutes.

The pain is epigastric and may be referred to the right side and up to the right breast. In the earlier stages vomiting is very frequent. Later when stenosis has developed vomiting is a constant symptom. One must constantly keep in mind when considering the symptoms of duodenal ulcer, the pathology from the initial stage of duodenal irritation to the final stage of a contracted healed ulcer causing pyloric stenosis and all that may occur during the intervening period. Hæmatemesis occurs in a few cases when with the pylorus relaxed blood regurgitates from the duodenum into the stomach, but more frequently malena is the indication of hæmorrhage. Faintness, pallor and sweating may also indicate hæmorrhage and precede the passage of tarry stools. One patient, a medical man himself, was found in a state of collapse on the floor of his office from hæmorrhage, the first real indication that he had a duodenal ulcer. A profound anæmia with slight indigestion has been seen and malena only discovered later by accident.

Eructations of sour or bitter fluid and gas are very constant.

Variations from the typical occur when the ulcer is situated in the second part of the duodenum, the pain may be spasmodic in character and jaundice may be present. In these cases the symptoms may simulate those of gall stones. There is a group of cases in which the only complaint is one of "acidity" or "heartburn", sometimes slight and easily controlled by bicarbonate of soda or bismuth, sometimes severe and very troublesome. From some of these a history of attacks of hunger pain might be elicited by careful enquiry. Another group of cases seek medical advice for repeated and copious vomiting, the result of cicatricial stenosis and only on a careful investigation can a previous history of "indigestion" or "acidity" be obtained; the active ulcerative stage being passed with little inconvenience to the patient.

In another the symptoms are very vague and indefinite and usually those of indigestion without any suggestion of an organic basis, while in still another and smaller percentage there may be no symptoms until hæmorrhage or perforation has occurred.

There is a smaller percentage of cases with history of ulcer where its location cannot be determined. The pain of a prepyloric ulcer usually comes on earlier and may also be relieved by the taking of food.

While the clinical history usually spells the diagnosis the thorough investigation in every case will call for, in addition, a careful physical examination of the patient with tender points noted and complications or concomitant lesions looked for. Gastric acidity tests, examinations of gastric contents and fæces for blood, and lastly, and second only in importance to the clinical history,—a careful *x*-ray examination.

The physical examination in this condition may be entirely negative, and with the usual healthy appearance that these patients present the condition may be overlooked. There is usually some tenderness in the epigastrium and to the right over the duodenum. As a chronic appendicitis is so frequently a concomitant of this disease some tenderness is frequently found about McBurney's point.

It is our routine to make gastric acidity tests in all stomach cases, and we have found hyperacidity in approximately 80 per cent. of ulcer situated near the pylorus.

We have not found the examination of fæces for occult blood of practical value. Occult blood may occur from so many sources from the mouth and nose to the anus, that its value as a diagnostic sign is lost. Blood appearing for one day and absent for one or more days to reappear is suggestive of ulcer, while blood found constantly in the stool is suggestive of malignant growth.

X-ray examination by an experienced rœntgenologist is of the greatest importance in confirming or making a diagnosis. In the first place clear plates are taken of the whole abdomen. This by a process of elimination, excludes diseases of the spine, kidneys, ureters and bladder that are demonstrable by this method. I know of one case where the precaution of first taking plates was omitted, a barium series was done and a stone in the kidney was missed.

The chief point in making the diagnosis of duodenal ulcer from the *x*-ray standpoint is deformity of the duodenal cap. This, if constant at all examinations, would be almost pathognomonic. The only other condition that causes persistent deformity of the cap is adhesions, and this while common in the second part of the duodenum in pericholecystitis, is very unusual in the first part except when due to ulcer. I believe a spastic incisura may occur in the duodenum as well as in the stomach in chronic appendicitis and gall stones. This, however, would not be constant and would be relieved with atropin.

Hyperperistalsis is invariably present, and there may be hypermotility especiallly in the initial stages, the stomach emptying in two or three hours. Later pyloric spasm may cause hypomotility and there may be a four or even six hour residue, and that without organic stenosis.

Akerlund[2] commenting on the local spasm that may be induced by duodenal ulcer, and on the distant spasm which it may induce in the body of the stomach says, "that the local spasm at the site of the ulcer explains some of the symptoms of duodenal ulcer. It occurs as spasmodic contraction of the stomach with gastric ulcer. A rœntgenogram showing local constricting spasm in the bulbus of the duodenum, accompanied by local tenderness, is convincing proof of duodenal ulcer, he thinks. This spasm causes a characteristic scalloped outline in the rœntgen shadow of the upper duodenum; there seems to be always a round protruding bunch which represents the ulcer itself, the spasm nearly closing the lumen of the duodenum just above and below this knob-shadow. The pylorus is generally wide open. The spasm of the region of the duodenal ulcer explains the initial hypermotility and the 'paradoxic' four hours' retention, the spasm coming on gradually as digestion progresses, after the hypermotility at first."

Differential Diagnosis. In differentiating duodenal ulcer from gall stone disease many points must be considered. With typical attacks of cholecystitis there is no difficulty. Here too the attack frequently comes on in the night but there is no regularity as in duodenal ulcer, and the pain is usually sudden in onset and severe and ceasing abruptly. The cases which cause most difficulty are those of cholelithiasis associated with hyperchlorhydria and indigestion. The symptom of belching of gas is, I believe, much more marked in cholelithiasis than in ulcer. Stone impacted in the cystic duct gives a constant pain and distress in epigastrium and right hypochondrium which is usually aggravated by food and not relieved thereby as in ulcer. The pain of gall stones is usually referred to the right shoulder, not so with duodenal ulcer, though I have seen two cases of gall stones where the pain was referred to the left shoulder, and one case of duodenal ulcer where the pain was referred to the right.

Both conditions may be present and increase the difficulty in diagnosis.

Chronic appendicitis is not often confused with duodenal ulcer. There is in our observation a constant change from time to time in the type of symptoms in a large percentage of appendix cases. The patient may begin with indigestion and some gas. Later pain develops but its relation to food is not constant. Some patients give a history of food relief at one time and food excitation at another. Exercise increases the pain and symptoms in chronic appendicitis but not in ulcer. There may be hyperchlorhydria or hypochlorhydria. Patterson[3] has pointed out that free hydrochloric acid is frequently absent in chronic appendicitis. I remember operating upon in one week, three cases of "indigestion" due to a diseased appendix, in each of which there was absence of free hydrochloric acid.

Other conditions requiring differentiation are gastric ulcer, gastric cancer, linitis gastrica or fibromatosis of the stomach, chronic dilatation, syphilis, tuberculosis of stomach, cholecystitis and pericholicystic adhesions, chronic pancreatitis and pancreatic calculus, hernia, especially those of the linea alba and umbilicus, intestinal parasites, visceroptosis and moveable kidney, renal calculus and the gastic crisis of tabes dorsalis.

If a thorough routine clinical investigation be carried out in all cases there should be very little difficulty in arriving at a correct diagnosis in at least 95 per cent. of cases.

In making a differential diagnosis in obscure abdominal conditions, it is very important to bear in mind that the patient may have more than one pathological condition present, and in fact this is very frequently the case, and then we have what Oliver Wendell Holmes used to call a snarl and tangle of symptoms.

Two of my cases of hour glass stomach had associate duodenal ulcer. One had also gall stones, and the other had a subacute appendicitis, another had extreme gastroenteroptosis, and four cases of gall stones had also duodenal ulcer as a concommitant condition.

Treatment. The prophylaxis of duodenal ulcer has probably never been discussed, but when we consider the conditions that are enumerated as causes, it would appear that a great deal might be done in a prophylactic way, the more thorough investigation and more rational medical treatment of cases presenting slight digestive disturbances, might lead to the anticipation and thus to the prevention of ulcer in a fair percentage of cases. The treatment of hyperacidity along the lines advocated by Sippy for ulcer; the removal of infected foci, such as septic tonsils, abscessed teeth, and chronically diseased appendices and gall bladders should be undertaken, not only as a prophylactic against ulcer, but for the general well-being of the patient.

When duodenal ulcer has been diagnosed, the treatment will include in addition to the removal of all infected foci by surgical or other means, a thorough course of medical treatment, and special diet, with the patient at rest in bed. Sherren[4] says that "Ambulatory treatment is certainly a failure, he having operated on two patients in which perforation occurred while under this treatment. It should be borne in mind that though the attack of symptoms has subsided, the ulcer may be by no means healed, and therefore treatment should be continued for a long time after the patient is about and apparently well. At intervals of a month or more *x*-ray examination should be made, and the progress of the case noted.

When Moynihan began the surgical treatment of duodenal ulcer it might be inferred that medical treatment of this disease had not been well developed. However, he advocated medical treatment in the first and even the second attack. More recently Friedenwald[5] gives the cure by various medical means as follows: Lenhartz 66 per cent., Leube 72 per cent., Sippy 86 per cent., and further says that cases that resist thorough medical treatment especially should be treated surgically. From this it will be seen that with increased efficiency in medical treatment, the need of surgery becomes less. There is, however, a large residue of uncured cases, and for these surgery offers definite relief.

Treatment, Surgical. Surgical treatment of duodenal ulcer that has been fortunate enough to reach the stage of cicatrization and contraction with obstruction is admittedly ideal. Gastroenterostomy which is still the operation of choice for this condition, was first performed by Codeville in 1893. It is a short circuiting operation, and the result is invariably good.

When acute perforation into the free peritoneal cavity occurs, the condition demands immediate recognition and prompt action. The question as to whether gastroenterostomy should be done at the time the perforation is closed, and whether or not drainage of the peritoneal cavity should be instituted, depends on many factors which will not be discussed here. Bloch[6] mentions as a sign of impending perforation persistent pain in the ulcer area. Subacute and chronic perforation may cause adhesions, fistula, or abscess formation, and these have to be dealt with surgically.

The operative results are by no means all that could be hoped for, yet when it is considered that the cases operated on have invariably resisted medical treatment for a long time the results are extremely favourable. Moynihan gives his results as 70 per cent. cured, 18 per cent. improved and only one case no better.

The complication of hæmorrhage should be treated medically at first. If hæmorrhage is profuse, or repeated hæmorrhages occur, operation is definitely indicated. If operation is undertaken gastroenterostomy, which has frequently been done with the hope of putting the part at rest and thus stopping the bleeding, is futile. Excision or cauterization of the ulcer should be done.

If the operation is an interval one, gastroenterostomy should be done at the same time, but if hæmorrhage has been severe and the patient's condition serious, gastroenterostomy should be done at a later date, unless the patient is relieved from all symptoms of ulcer.

While the indications for surgical intervention in the foregoing conditions are well defined, the indications in uncomplicated ulcer are still debatable. Randall Short[7] says that "medical treatment after the first attack is not only futile but dangerous. Delay is not to be countenanced. The danger of perforation is great, and frequently occurs between attacks when the patient is free from symptoms and apparently well."

This view is an extreme one and certainly in the light of recent results of medical treatment requires modification. However, Deaver[8], in a very recent article on Peptic Ulcer reports in the year 1918 perforation had occurred in 5·2 per cent. of his cases, and says: "Every medical man of large experience, I am sure, has had the unpleasant opportunity of observing perforation occur while the patient has been in a hospital or in his own house undergoing medical treatment for what is essentially a surgical condition. The proper time for medical treatment for chronic indurated peptic ulcer is not before, but after operation (if treatment is still then needed)."

The questions to be considered are, the operative mortality, and operative results. The operative mortality for gastroenterostomy may be placed at from 2 to 4 per cent. Moynihan has probably the best record, namely 2 per cent., and in his last three hundred cases he states that he has had no deaths. Sherren had three hundred and twenty-five cases with six deaths. Against these operative results, Randall Short[9] in discussing the prognosis in duodenal ulcer quotes the statistics of various authors who placed the mortality as high as 40 per cent., and says that from perforation alone 17 per cent. died. These are the statistics of actual post mortem records, and I think it can be safely said that they are higher than would be obtained at the present time, yet they show that the condition is a very serious one.

When surgical treatment has been decided on as the proper precedure, each individual case must be dealt with on its own merits and according to the pathology found when the abdomen is opened. The operation is primarily exploratory and is essential to a final diagnosis before a definite procedure for dealing with the ulcer is undertaken. Two points should be kept in mind; namely, search for and elimination of other pathological lesions that may have an ætiological bearing; and secondly, the demonstration by sight and touch of the presence of ulcer. Unless the ulcer can be seen and felt, operation for its relief should on no account be done. Moynihan in his former, as well as his most recent writings, lays great emphasis on this point and recites cases where the operation for ulcer has been performed in the absence of any organic lesion justifying it.

The appendix should first be sought and removed. It would be better to do this through a separate small McBurney incision rather than lengthen unnecessarily the one already made. It is impossible from examination of the appendix *in situ* to exclude the presence of infection.

When in addition to ulcer, cholecystitis or gall stones are present, the condition is a more serious and complicated one. One has to decide whether to deal with the gall bladder or the ulcer, or both. No doubt the expert operator would deal with both conditions including the appendectomy, and probably successfully too in most cases, but I believe that the interest of the patient is served best by doing two such serious operations at two separate occasions. As to which should be done first depends on which lesions has been most active in producing symptoms and the actual pathology present. Thus an ulcer that had been bleeding or was tending to perforate would call for immediate attention, while one with a thick base and protecting adhesions might be left provided the gall bladder condition appeared more urgent. In the latter case medical treatment should be further tried, and if this again failed, the ulcer should be dealt with surgically.

Returning to the duodenum and stomach careful examination is made to ascertain the number, size, position and condition of the ulcer or ulcers present. Gastric and duodenal ulcers frequently co-exist. In two cases of hour glass stomach, I have had, duodenal ulcer was present in each. In these two cases in addition to sleeve-resection of the stomach, the jejunum was anastomosed to the second pouch to take care of the ulcer in the duodenum.

Another case in which I was associated with one of my confrères in the treatment, had in addition to duodenal ulcer, an ulcer at the cardiac end of the stomach. Some weeks after the operation of gastroenterostomy he developed an œsophageal obstruction. This was relieved by the passing of bougies through the œsophagescope by Dr. George Fletcher.

In considering the surgical procedures now done for the relief and cure of duodenal ulcer it is interesting to note that the operation as already mentioned, was one of short circuiting for obstruction to the outlet of the stomach. This same procedure was later applied to cases of duodenal ulcer without obstruction on the assumption that by side-tracking the gastric contents before they reached the duodenum the ulcer would be put at rest and thus given a chance to heal. Patterson, however, has shown that it is not a mechanical but a physiologico-chemical operation, in that the hyperacid gastric content is neutralized by the alkaline bile and pancreatic secretions passing into the stomach through the new stoma. Finney's operation of pyloroplasty which was originally done for pyloric obstruction seems to cure duodenal ulcer in the same way.

Wilinsky and Crohn[10] state, after an investigation of thirty-seven post-operative cases in which gastroenterostomy was perfromed, that the functional efficiency of the stomach is definitely impaired in a large percentage of cases, and draw attention to the well-known fact that the best results after operation have been obtained in cases in which some pathological process has gradually caused a stenosis at the pylorus.

They return on the whole a rather gloomy verdict for the operation of gastroenterostomy, when performed for cases without pyloric obstruction.

In my own cases on whom I have performed gastrojejunostomy for duodenal ulcer both with and without pyloric obstruction, and I have been able to trace most of them, I do not know of any unfavourable result. There were two cases that had to be re-operated; one for vicious circle three months after the first operation, and one for jejunal ulcer six years after the primary gastroenterostomy. Both of these cases are now perfectly well. The latter case I have recently seen and examined two years after excising the jejunal ulcer. He states that he has never had better health and has not been so well for fifteen years. The radiographic report at the present time on this case is as follows:

"Mr. T. B. *X*-ray findings. The stomach is normal in contour and size. The barium meal emptied through a gastroenterostomy opening which appears to have pyloric action, so that the stomach emptied in a little less than four hours. There was only a trace of the meal seen passing through the normal pylorus."

I would like to point out further in connection with this case, that at the primary operation no silk or linen was used, both rows of sutures being of No. 1 chromic catgut. Non-absorbable suture—material cannot be blamed for causing jejunal ulcer in this case. Repeated gastric analysis, however. showed a persistent high, free and total acidity.

Sherren[11] has done some extensive investigations on cases before and after operations for duodenal ulcer, and has shown that there is both a more rapid emptying of the stomach and a reduction of acidity after gastrojejunostomy and further shows that the reduction in acidity is greatest when the anastomosis is well toward the cardiac end of the stomach, and again that in eleven cases where the anastomosis had for various reasons to be done nearer the pylorus than usual, lowering the gastric acidity had not been so marked, and even a temporary increase had been noted. Examination of twenty-six cases in from four to nine years after operation had been made showed that acidity was still low. This strongly suggests permanency of this post-operative reduction of gastric acidity.

Gastrojejunostomy the posterior no loop operation is the one of choice and this alone was formerly considered sufficient to effect the healing of the ulcer. More recently, however, the majority of surgeons advocate dealing with the ulcer directly by infolding, excision, resection or cauterization and gastroenterostomy.

Bland-Sutton[12] has given up gastrojejunostomy as a routine method of treatment of gastric and duodenal ulcer, and advocates resection of the pylorus and the segment of the duodenum containing the ulcer. This I think will not be followed in duodenal ulcer by the majority of surgeons for the following reasons: It is too severe a measure for duodenal ulcer alone as simple infolding or excision seems along with gastroenterostomy to be adequate. While a justifiable procedure in prepyloric ulcer on account of the frequency of malignancy developing, in duodenal ulcer malignant change is so rare that it could not be justified on that ground. Carmen[13] has not seen malignancy developed in a duodenal ulcer, except where the ulcer has spread to the gastric side of the pylorus, and I have had only one case in which malignant disease unquestionably developed on a chronic duodenal ulcer. This patient had at the time seen obstructive jaundice from involvement of the common bile duct.

The operation that I do is the posterior no loop gastrojejunostomy, with the bowel placed contra-peristaltic, that is, with the jejunum attached to the posterior wall of the stomach as it normally lies in the abdomen from right to left. In addition the ulcer is infolded with fine chronic and further protected with an omental graft. Since the year 1912 I have not used any silk or linen in my stomach or intestinal work, chromic sutures being used for both rows.

We have had in the past year or more a considerable number of cases of stomach trouble which do not give a typical history or present a typical ulcer syndrome. They have had symptoms suggestive of chronic appendicitis with indigestion, but the point about these cases is, that the *x*-ray report shows a deformed cap which may, or may not, be persistent in all examinations. The summing up of the rœntgenologist usually is, "Chronic appendicitis with possibly duodenal ulcer." In these cases we have invariably removed the appendix through a small McBurney incision without exploring, and then having the case treated medically and kept under observation, *x*-ray examination being done from time to time. In all these cases the appendix has been definitely diseased. It is too soon to report fully on the ultimate outcome in these cases, but I know that many of them have been entirely relieved of all symptoms. In this connection I would like to quote from a recent interesting article by Arthur F. Hurst[14] of Guy's Hospital, London:

"The association of chronic appendicitis with both acute and chronic duodenal ulcer is too common to be a coincidence and the greatly diminished tendency to relapse, especially of acute ulcers, following the removal of the appendix without interfering with the ulcer, shows that the appendicitis is the primary condition."

In conclusion I would like to say that the treatment of duodenal ulcer by medical means alone, or by surgical means alone, or by both, without a thorough search for, and removal of all possible causes is absolutely wrong, and will contribute to that ever present percentage of unsatisfactory cures, both medical and surgical.

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DERMATOLOGY

Treatment of Generalized Psoriasis. Mook, W. H.: *Arch. of Derm. and Syph.*, October, 1920.

The writer presents an intensive treatment of psoriasis with an ointment evolved by a London physician, from experience in a large military hospital. The ointment consists of 2 per cent. phenol, with 10 per cent. chrysarobin in petrolatum, in which the phenol acts to intensify the action of the chrysarobin. He protects against chrysarobin dermatitis with soothing applications, *e.g.*, ichthyol, corn starch and petrolatum. When applied to the face he warns especially against causing conjunctivitis. Applications are made once daily, and are discontinued on the appearance of dermatitis. He claims that the treatment should be effective in less than twenty-five days; but he makes clear the disadvantages attending use of this ointment, such as the destruction of clothing, and the necessity for hospitalization in order to control the application, and he advises its use only in connection with cases having severe symptoms, which require speedy relief.

R. E. MacDermot.

Some Studies on Lichen Planus, Based on the Study of One Hundred and Seventy-Nine Cases. Jacobs, F. M.: *Arch. of Derm. and Syph.*, November, 1920.

Jacobs can find no positive evidence that this disease has either a nervous or an infective ætiology, but thinks that the balance is in favour of a microbic origin. The histology of the lesion especially suggests this. In treatment, mercury, arsenic and the *x*-ray are all efficient. Pruritus (a symptom he found to vary widely in severity) disappeared under the use of mercury before the eruption itself was affected. In the subacute conditions, protiodid of mercury, and Fowler's solution, were always successful. In chronic cases, arsenic in the shape of Asiatic pill, was most effective. A few long standing cases were improved by the *x*-ray. Arsphenamin and its derivatives were found to be of very little value in this condition.

R. E. MacD.

X-rays and Radium Combined with Excision in the Treatment of Keloids. Pfahler, G. E.: *Arch. of Derm. and Syph.*, August, 1920.

The author states that the *x*-ray and radium are the only agents known to arrest the condition, or cause it to disappear. He emphasizes the need of employing the treatment early.

The *x*-ray treatment should aim at a progressive atrophy without erythema or destructive effect on skin. In mild cases he generally uses five milliamps. of current, two millimetres of filter, with focal distance of eight inches, a parallel spark of nine inches, and a period of two minutes, repeated in three or four weeks. For older cases he increases the time to eight minutes and six millimetres of filter, obtaining where possible a cross-firing effect.

Radium gives almost identical results, and he dwells on the value of combining these two. In very large keloids he uses the *x*-ray first, then excises, and after that the *x*-ray again, to keep the scar to the level of the skin, and to prevent recurrence. He is fully alive to the danger of lupus following the *x*-ray, but claims proper screening obviates this.

R. E. MacD.

THE DIAGNOSIS OF GASTRIC ULCER

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In a discussion of the relative values of the various methods available for the recognition of gastric ulcer, I have been asked to state the case for the radiographic method. Approaching this with the confessed bias of one whose viewpoint is limited to one method of observation, I yet do so with the consciousness that in this work our results are checked and rechecked and the decision as to whether we are right or wrong is nearly always in other hands than our own. This then provides surely, a situation from which an accurate estimate of the worth of the method may be reached.

In the Department of Radiology in the Toronto General Hospital our cases come to us from two different sources. Those from the teaching wards have usually been thoroughly worked out and a clinical diagnosis made before the case is referred to us for investigation. Cases from the private wards or from private physicians are not so well worked out. But in each case a tentative diagnosis has been made, and an effort is always made to obtain this.

Thus in the majority of our cases we are able to balance the accuracy of one method against the other when the final and proved diagnosis becomes available.

In opening the discussion of the *x*-ray recognition of gastric ulcer it becomes necessary to say a word about technique, and in this I regret to have to take issue with Dr. Hardisty, but feel very strongly on this point. Our experience has been that much more accurate results can be obtained by a careful combination of the screen with serial plates. Either alone is incomplete, and will fail to provide essential information. Very elaborate series of plates are not necessary, but a serial study of one complete cycle of the events in the stomach is sufficient in ordinary cases providing the plates are made rapidly enough. This should be at a rate of not less than ten to the minute, and there is no special gain in greater rapidity than this. In difficult cases more elaborate series will be helpful. More than two years ago I adopted the method of making a series of ten plates at this rate in practically every case in combination with the same screen examination I had formerly been using. Within the first two weeks I recognized two gastric ulcers which could not be visualized upon the screen. Since that time a similar experience has been repeated so often in gastric ulcer, and so much *more* often in duodenal ulcer, that I am most thoroughly convinced on this point. Screen examination is made in the standing, prone, lateral or oblique position, whichever gives the best view of the stomach, and careful palpation with the gloved hand or wooden spoon is carried out simultaneously. The plates are made in the position which on the screen provides the clearest view of the entire stomach and of the caput. This also may be standing, oblique or prone, although it is usually the latter. If there is much spasm at the pylorus we wait until this relaxes and free function is established before commencing the series. This may be ten minutes or it may be one hour. The point is determined by the screen and during that time a written note is made of all the information we can gain regarding the stomach and duodenum, their form, function, mobility, etc., together with a statement as to whether an organic lesion can be seen or not. The final report is made from a study of the serial plates and this screen report. In this manner we have examined six thousand cases during the past two years, and an additional twenty-five hundred were examined during the preceding year when our equipment limited us to the screen.

The classification adopted has been the Mayo Classification, which divides ulcer into five classes:

1. Simple, mucous membrane erosion.
2. Indurated ulcer.
3. Penetrating ulcer.
4. Perforating ulcer.
5. Malignant ulcer.

Taking these up in turn I will admit at once that there are great difficulties in demonstrating a mucous membrane erosion, and that when these exist we usually miss them. But who is to say definitely whether or not they actually exist? The mere presence of blood is not sufficient, important though it be. The sudden profuse hæmatemesis without other symptoms is not this type, but more usually a ruptured varix. They give rise to no symptoms which are sufficiently definite to constitute a clinical entity.

Some months ago we thought we had such a case. I examined her twice, and found no trace of ulcer, yet she was having repeated severe hæmorrhages. In view of the seriousness of her condition an emergency exploration was done, and stomach opened and gone over most carefully, but no ulcer found. In a few days she died during another hæmorrhage, and at the

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Read at the Meeting of the Canadian Medical Association, Vancouver, B.C., June, 1920.

autopsy no bleeding point could be found, nor was the mucosa eroded.

2. The indurated ulcer I take to be that form in which an inflammatory thickening is present including most of the depth of the mucosa, but not involving the muscular layer. This is the acute ulcer, and while in this stage may give rise to definite symptoms such as localized pain, vomiting, etc., with occasional bleeding. It does not long remain in this condition, but either heals or goes on to the next form. Even in its present form at least 50 per cent. are recognizable at *x*-ray examination by reason of the inelasticity of the gastric wall over their site. The wave of peristalsis is seen only on the greater curvature leaving a flattened area over the ulcer.

A sufficient number of these ulcers have been recognized to convince me that they can be demonstrated If the induration is very diffuse it is more difficult, and may be impossible. This type of induration may bleed, and is the form frequently referred to as "ulceration" as distinct from "ulcer".

3. *Penetrating Ulcer.* Here we are on much firmer ground. This is the ordinary gastric ulcer which is the result of the further extension of the indurated type until the mucous membrane sloughs over a circumscribed area down to or even through one or other of the muscular layers. For the first time we are dealing with a concrete lesion. This ulcer may be acute or chronic. It may occur in a short period of time and be accompanied by severe symptoms of pain, vomiting and hæmatemesis, or its onset may be spread over so long a period that no definite date can be set for its beginning. Our experience in studying these ulcers is that if they do not heal after two or three months of strict medical treatment in bed, they then become chronic and probably will never heal of themselves.

These ulcers are practically always demonstrable upon the plate, and are not by any means always demonstrable on the screen. The *x*-ray evidence depends upon the demonstration of a crater large or small with an incisura opposite. The crater when constant is diagnostic. The incisura alone is not, although it is helpful confirmatory evidence. Demonstration of the actual lesion is, however, insisted upon and we do not place reliance upon the "symptom complex" method by which the presence of an ulcer is inferred from the behaviour of the stomach as seen on the screen.

Plate I. is a good typical example, and contains all the essential information for the diagnosis.

4. *Perforating Ulcer.* Here the process of extension has gone a step further, and the ulcer has now sloughed through all of the muscular layers, and is separated from the general peritoneal cavity only by the serous layers of the stomach or by a mass of adhesions walling it off. If sharply limited it forms the well-known accessory pocket, but this may be very large and diffuse. Such pockets may or may not empty with the emptying of the stomach. It has been our experience that as a general rule the incisura disappears with the penetration of the ulcer through the last layer of muscle, and I regard this as a very helpful, though not infallible guide in estimating the depth of an ulcer.

5. *Malignant Ulcer.* This is the degeneration of an ulcer into a cancerous process. For some years we have been taught that ulcer of the stomach tended to become malignant, whereas ulcer of the duodenum did not. This is too big a question to take up here, except to observe that if this were the case it seems certain that such a transition would be seen much more frequently than is actually the case in view of the thousands of examinations being made all over the country. When recognized even in its early stage, cancer is frankly cancer, and bears no resemblance to ulcer, while the number of cases in which ulcer has been demonstrated, passing over into cancer is small. However, it probably does occur, and should be included in any classification.

The study of a large series of gastric cases with their indefinite or even misleading clinical symptoms, in which the *x*-ray examination has been the means of providing definite information upon which an accurate diagnosis has been based, is after all the most convincing proof of the value of this method. The following cases are added as illustrations. In almost all of these the diagnosis was inconclusive or definitely wrong and the *x*-ray examination provided the essential information from which correct conclusions could be drawn.

Case No. II. Was referred for examination three years ago with a written diagnosis of chronic appendicitis. *X*-ray examination showed a deep incisura on the greater curvature, and on the lesser curvature opposite it a large flat area, which was inelastic, but no crater was present. Diagnosis: Gastric ulcer of the indurated type.

One year later I again examined this patient, and found an extension with crater formation as is shown in Plate No. III. Here we have, I believe, a demonstration of the development of a chronic gastric ulcer.

Case No. IV. Clinical Diagnosis: gastric carcinoma. *X*-ray diagnosis: Penetrating ulcer on the posterior wall near the lesser curvature with hourglass contraction.

Surgical findings: Penetrating ulcer on posterior wall near the lesser curvature with hour-glass contraction. Sleeve resection. Pathological report: Non-malignant. Shortly after this the patient had another attack, and was referred again for *x*-ray examination.

Plate No. V. shows the second finding diagnosed as another ulcer on the lesser curvature extending from the upper segment downwards and backwards.

Surgical findings: Ulcer extending from upper segment, and having its base against the aorta. Gastroenterostomy done.

When the ulcer becomes a perforating one the incisura very frequently disappears as is illustrated by Plate No. VI. Here the ulcer was adherent to the pancreas, which probably prevented its further exextension.

Plate No. VII. Clinical Diagnosis: Duodenal ulcer.

X-ray Diagnosis: Duodenal ulcer plus penetrating gastric ulcer which has penetrated through all the muscular layers to the serous coat of the stomach.

Surgical Findings: Duodenal ulcer and deep penetrating ulcer. Gastroenterostomy.

Size of Crater. In connection with the discussion as to the significance of the size of the crater the general teaching has been that ulcers measuring 3-5 cm. across the crater are probably maglignant and Carman reports several such. The next two cases illustrate very large ulcers and several other cases in which the craters were of larger size than usual.

Case No. VIII. Clinical Diagnosis: Pyloric obstruction.

X-ray Diagnosis: Large penetrating ulcer with much induration on the lesser curvature.

Surgical Findings: Large ulcer on the lesser curvature. Gastroenterostomy done.

Pathological Report: Adeno-carcinoma.

Two months later the patient was again examined. The findings are shown in Plate No. IX. The ulcer has disappeared and there is no evidence of carcinoma.

Two months later than this another examination shows the condition to be unchanged. Plate No. X. Here we probably have a case which was not malignant.

Case No. XI. Clinical Diagnosis: Advanced carcinoma.

X-ray Diagnosis: Large perforating ulcer on lesser curvature with marked induration of gastric wall.

Surgical Findings: Perforating gastric ulcer—non-malignant. Other ulcers of large size are illustrated by plates No. XII and others not illustrated here. None of these were malignant on section.

Case No. XIII. Clinical Diagnosis: 1. Angina pectoris. 2. Gall stones.

X-ray Diagnosis: Penetrating gastric ulcer on the lesser curvature.

Surgical Diagnosis: Penetrating ulcer on the lesser curvature.

Case No. XIV was one of special interest from a radiographic standpoint in which the method weathered the storm of clinician, surgeon and pathologist.

Clinical Diagnosis: Perforated gastric ulcer.

Operated at once without *x*-ray.

Surgical Diagnosis: Perforated gastric ulcer which was repaired.

Pathological report. Non-malignant.

X-ray one week later: Extensive carcinoma of the stomach.

Autopsy: Extensive carcinoma of the stomach.

Case No. XV. Clinical Diagnosis: Gall bladder.

X-ray Report: Pyloric obstruction by an old ulcer of the duodenum with perforation and accessory pocket passing backwards and upwards along the great vessels to the under surface of the liver.

Surgical findings: Confirmed *X*-ray findings.

Case No. XVI. Clinical Diagnosis: Gastric ulcer.

X-ray diagnosis cicatricial stenosis of the lower end of the œsophagus.

Surgical findings: As above.

Case No. XVII. Clinical Diagnosis: Nervous indigestion for twenty years.

X-ray Diagnosis: Diverticulum of duodenum.

Surgical Diagnosis: Diverticulum of duodenum.

Case No. XVIII. Ditto.

Case No. XIX and XX. Pyloric stenosis as a result of older ulcer.

As a result of these and many other similar cases the position of the *x*-ray in diagnosis of gastric ulcer should be beyond doubt. Not only is the information definite, but it is extensive, and covers many aspects which cannot be ascertained in any other manner except by exploration. Even here the information has been more accurate than by exploration on several occasions.

In closing I wish to express my indebtedness to my colleague, Dr. W. H. Dickson, for material assistance, many of the quotations made being taken from his reports.

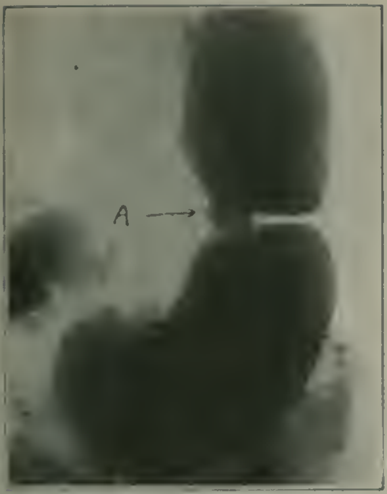

PLATE I.

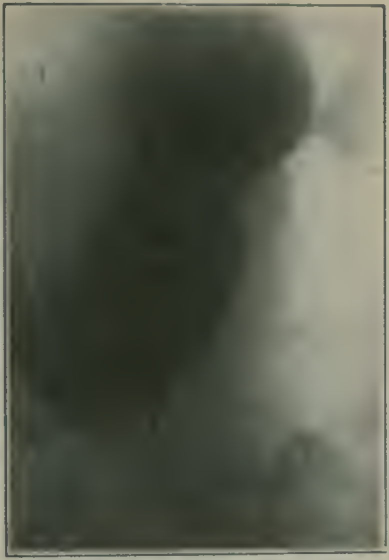

PLATE II.

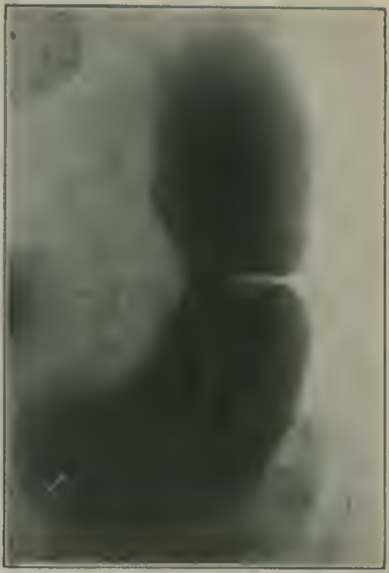

PLATE III.

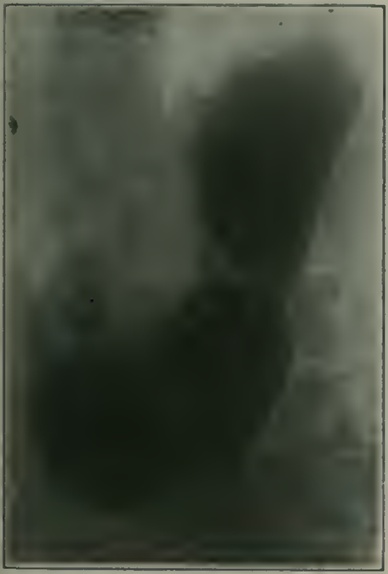

PLATE IV.

PLATE VI.

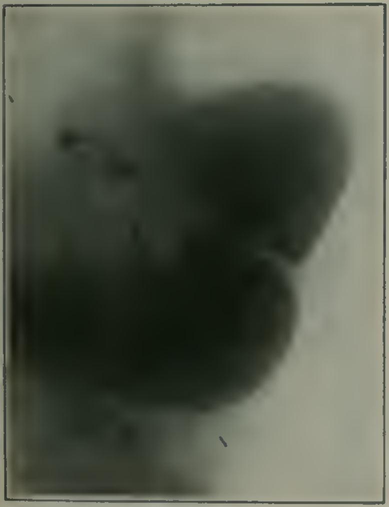

PLATE V.

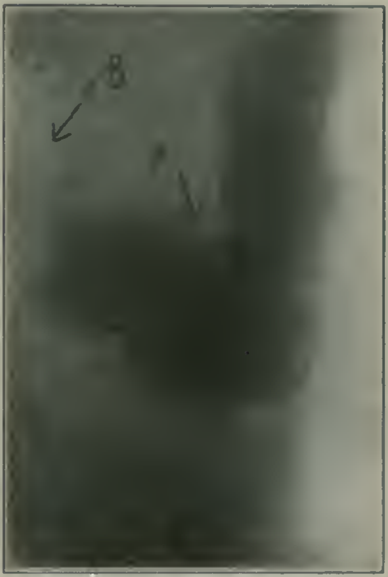

PLATE VII.

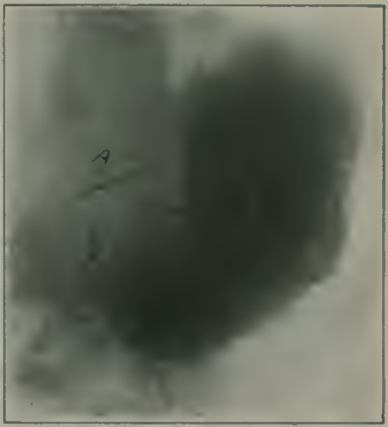

PLATE VIII.

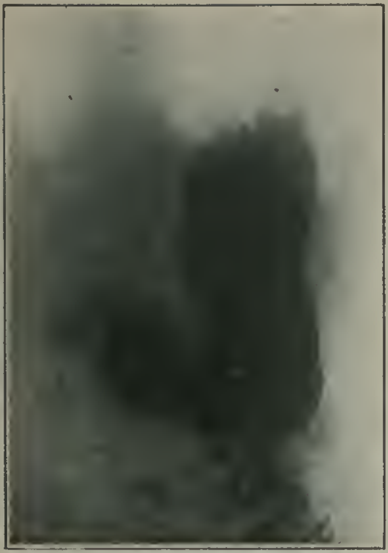

Plate IX.

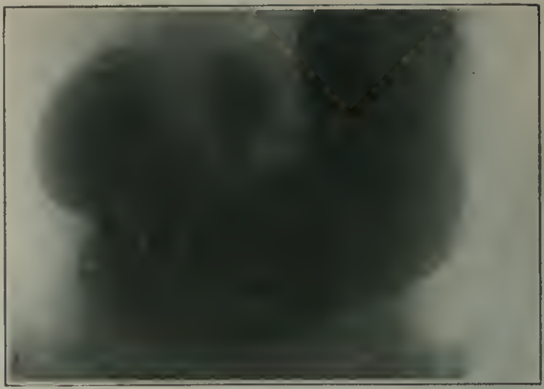

Plate XI.

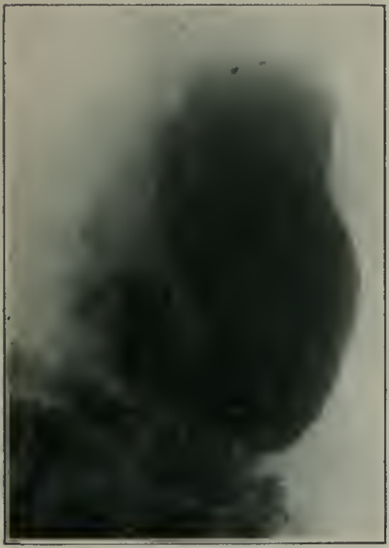

Plate X.

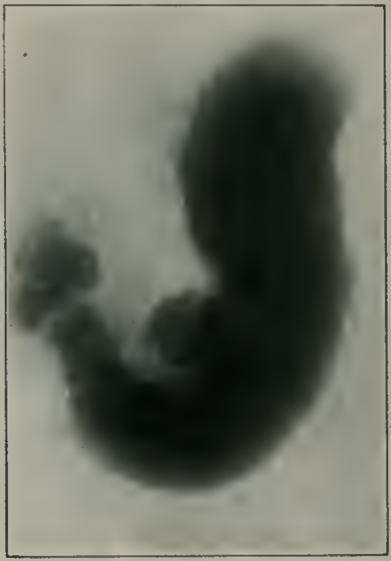

Plate XII.

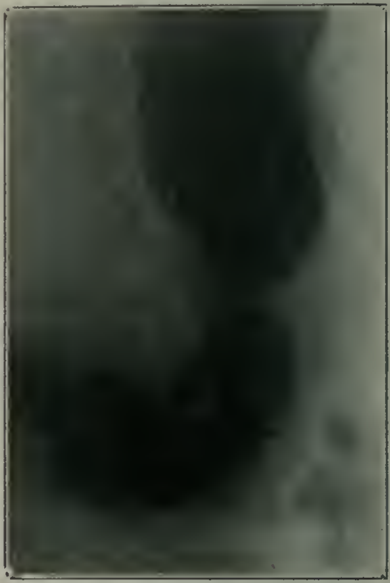

Plate XIII.

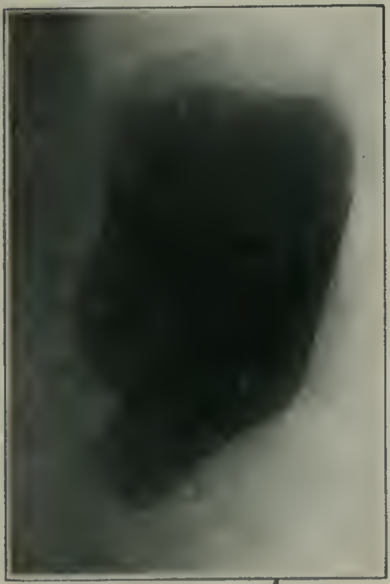

Plate XIV.

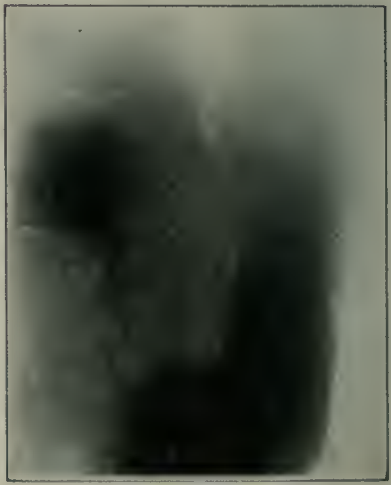

Plate XV.

THE DIFFERENTIAL DIAGNOSIS OF APPENDICITIS

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THE abdomen is opened more frequently for the removal of a diseased appendix than for any other variety of visceral disease. Every surgeon therefore has abundant opportunity to study appendicitis in its varied forms. Sir Berkeley Moynihan, some years ago, called special attention to the value of the study of pathology in the living and, I suppose, there is no field in surgery which has given us more frequent opportunity for observation than the study of the diseased appendix in the living subject. We have had vast and accumulated experience to aid us in interpreting the signs and symptoms which exist before operation, in the light of the conditions found on opening the abdomen. Yet we must confess to-day that, at times, the diagnosis is extremely difficult and it therefore becomes an important subject for discussion. In the differential diagnosis of lesions of the right side of the abdomen we frequently have to deal with appendicitis both in its acute and chronic form.

A typical case of acute appendicitis presents a very characteristic clinical picture. The symptoms are familiar to us all, we have a history of abdominal pain, often epigastric at first and then localizing in the right iliac fossa, rigidity of the muscles in the lower right side of the abdomen, often exquisite tenderness on pressure over this region with a history of vomiting and occasionally diarrhœa. The temperature and pulse may be normal or there may be a slight rise of both. Blood examination will show a leucocytosis and the diagnosis, from a study of these symptoms is readily made. There is often a history of previous attacks to confirm our conclusions. It is true the symptoms which I have narrated may be induced by other conditions which have resulted in an inflammatory reaction in the right iliac fossa but, because of the great frequency of acute inflammatory conditions in the appendix, we will be right in our diagnosis in the vast majority of instances.

In a typical case, the diagnosis is not only difficult but often well nigh impossible even in the most serious types of the disease or in the hands of most skilful clinicians. Let me give an example:

A patient aet. 40 at the time of operation exhibited a perforated gangrenous appendix situated low down behind the bladder with general peritonitis and stinking pus in the pelvis. His illness had lasted seven days prior to operation and yet during that entire week his only symptoms were abdominal distress and difficulty in getting a free movement of the bowels. Throughout his preoperative illness there was no vomiting and no rise of pulse or temperature; the abdomen remained flaccid except a slight degree of rigidity over the upper part of both recti muscles. The only suggestive features in his history were a leucocyte count of 13,000 on the third day, together with pain at the point of the penis and frequency of micturition. The features of his post-operative history were vomiting and obstruction. He died four days after operation and at autopsy the pathologist found twelve inches of gangrenous small bowel in the pelvis, a collection of pus in the region of the spleen and a second collection in the mid line over the pancreas.

Those of us who have had extensive experience in operations for acute appendicitis have learned that most serious conditions may exist within the abdomen in the absence of the typical symptoms of the disease. A gangrenous appendix may exist without any rise of temperature or pulse, without any vomiting and without any perceptible rigidity of the abdominal muscles. The diagnosis of acute appendicitis in certain atypical cases is, at times, one of extreme difficulty, and demands the most careful sifting of clinical evidence in order that we may establish a correct diagnosis.

Let us now turn our attention to some of those aids to diagnosis which help us in reaching accurate conclusions. Anatomically we may consider that the most common position of the appendix is in the right iliac fossa; when it is situated there the diagnosis of acute appendicitis is comparatively easy. At times, however, the cæcum is pendulous and the appendix lies low in the pelvis. At other times, through failure in the descent of the cæcum or of complete rotation of the gut in development, or from both causes, the appendix may be high up in the middle line or in actual contact with the under surface of the liver, occasionally I have found it adherent to the gall-bladder and on one occasion it lay in the left iliac fossa. Under these conditions, when the appendix is far removed from its usual position the difficulties in diagnosis become greatly increased.

Subjective pain and pain induced by pressure upon the appendix in acute inflammation are valuable diagnostic signs. In that classic in medical literature by the late Mr. John Hilton, surgeon to Guy's Hospital,

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Read before the Clinical Congress of the American College of Surgeons, in the discussion of the differential diagnosis of lesions of the right side of the abdomen, Montreal, October, 1920.

entitled, "The Therapeutic Influence of Rest and the Diagnostic Value of Pain," we have what has long been recognized as a most inspiring monograph full of valuable suggestions as to the interpretation of pain. You will recall his lucid demonstration of the associated nerve supply to a joint, the muscles controlling the joint and the skin over the muscles—so that when the joint is inflamed and painful, the muscles are contracted to act as a splint and the skin over the muscles is exquisitely sensitive. Hilton, who wrote sixty years ago, applies the same principle to the abdomen, tracing the associated nerve supply to the intestinal wall, the parietal peritoneum, the muscles of the abdominal wall and the skin over the muscles. To quote his exact words he says: "The muscular apparatus of the abdomen, its serous membrane, the skin over the muscles, and the intestines themselves, are thus brought into harmonious associations." He then refers to the signs of acute peritonitis with abdominal rigidity and pain. He also very shrewdly remarks that "perhaps the only exceptions are cases of the asthenic forms of peritonitis which depend upon the blood being poisoned, then the influence of the nervous system is as nothing and we should not expect to find this tense and tight condition of the abdominal parieties." To-day with all our increased knowledge of infection and its effects we have not got very far beyond the facts thus elucidated by John Hilton.

Since Hilton's day we have more exact knowledge of the anatomy of associated nerve supply and the experimental physiologist has given us valuable data as to the function of these nerves. Gaskell devoted his life mainly to the elucidation of the problems of the involuntary nervous system and in his monograph on the subject we have a clear demonstration of the anatomy and physiology of the nerves supplying the viscera. Then again we have the inspiring work of Sir James MacKenzie in his book on "Symptoms and their Interpretation". Pottenger has written a monograph on the "Symptoms of Visceral Disease" in which, mainly from the work of Gaskell and MacKenzie, he has further traced the clinical application of our present knowledge of nerve control of the viscera. From these various sources we may cull valuable information which will help us in understanding the true significance of symptoms and in establishing the diagnosis in visceral disease.

It is not the purpose of the writer to discuss individual conditions which may lead to error in the diagnosis of appendicitis. The argument would be too discursive were we to pass under review each affection in turn which may come into consideration in the diagnosis. A. J. Ochsner has given us a list of thirty maladies which may be confused with appendicitis and one might add to that list. For example, I might add one, which Ochsner has not mentioned, namely, the rupture of a dissecting aneurism. A patient was admitted to my wards at midnight with a history of sudden pain in the lower part of the abdomen on the right side, on admission a mass was found in the iliac fossa; this was opened by one of my assistants. It proved to be blood. Hæmorrhage was severe and the wound was packed to control it. The man died and at autopsy was found a dissecting aneurism of the aorta which had burst into the right iliac fossa. Of the more common conditions which are apt to confuse us in our diagnosis we have cholecystitis, renal or ureteral stone, Dietl's crisis in movable kidney, perinephritic abscess, duodenal and gastric ulcer, acute pancreatitis, acute inflammation of the uterine adnexæ in women, the pain which frequently exists in early typhoid or the perforation of an ulcer in late typhoid, perforation and abscess in malignant disease of the cæcum, inflammation of the right spermatic cord in acute epididymitis and the referred pain from a right sided pleurisy or pneumonia.

Each of these and possibly others must be considered and excluded in establishing a diagnosis of appendicitis. Occasionally we find it impossible to do so, our diagnosis may be inaccurate but in many instances there may be no doubt as to the necessity for operation. We must be prepared to deal with such conditions as are found otherwise the surgeon who opens the abdomen, and discovers other than he expects will court disaster.

While not attempting to discuss the differential diagnosis of each condition which may confuse us in our diagnosis we may briefly refer to the methods employed in reaching our conclusions.

Through the sympathetic nervous system we have to consider a complicated reflex mechanism which links up the intestinal canal with the central nervous system in the dorsal and upper lumbar portions of the spinal cord. Another path for the passage of reflex impulses exists in the bulbo-sacral connections of the intestinal canal established through the vagus with the medulla and through the pelvic nerve with the sacral region of the spinal cord. It is not necessary for our purpose to describe the complicated anatomical connections or, in any detail, the physiological activities conducted through these nerve paths but the practical application of our more minute knowledge of these matters may be summarized by stating that, by the reflex mechanism established with the spinal cord through the sympathetic nerves, we have an explanation of certain sensory motor and trophic phenomena in connection with those portions of the skin subcutaneous tissue and the muscles of the body surface, which are associated in their nerve supply with the particular portion of the intestine which we have under examination. Again through the vagus and the pelvic nerve we have the paths of reflex activities motor, sensory and secretory, which are responsible for reflex effects carried from one organ to another, e.g., disturbed gastric function in cases of appendicitis. It has been suggested that certain paths for reflex manifestations exist through the vagus with the fifth nerve which clinically are expressed in headache, etc.

Regarding the vagus, this statement, in the light of our present knowledge, must not be taken as absolute. It might be more consistent to assume that the reflex effects carried from organ to organ may pass through either the vagus or the sympathetic, one or other or both may be responsible. Therefore with more strict accuracy we may use a term including both systems and assert that this reflex effect from organ to organ takes place through the "autonomic nervous system".

Our conception therefore of the explanation of the symptoms produced in appendicitis is based upon the nerve control and connections of the portion of the intestine in which the appendix is found. The abdominal viscera are connected through the sympathetic nervous system with the thoracic segments of the spinal cord from the fifth to the twelfth and possibly the first and second lumbar segments. The appendix is regarded as connected with the twelfth dorsal and first lumbar. Hence from the associated nerve supply of muscles and skin we have an explanation of the distribution of muscular rigidity and of cutaneous hyperalgesia.

The muscles which may show reflex motor effects would be the external oblique, internal oblique, transversalis, lower part of rectus, the psoas and the costal part of the diaphragm. We therefore have an explanation of the familiar phenomena of rigidity in the abdominal wall, producing a splinting effect of the lower abdomen on the right side when the underlying appendix is acutely inflamed. Occasionally we observe a tonic contraction of the psoas and a partial fixity of the diaphragm with impaired expansion of the right side of the chest.

The skin presents a condition of hypersensitiveness over a definite area. This is apparent at McBurney's point, and would appear to be a true viscero-sensory reflex. Just as Hilton demonstrated the superficial sensitiveness of the skin over an inflamed joint and traced its explanation to an association in nerve supply, so here the superficial sensitiveness of the skin is effected through a nerve reflex. Mr. Ligat has recorded certain observations on the diagnostic value of maximal points of hyperæsthesia of the skin and subcutaneous tissues of the abdominal wall in affections of the abdominal viscera. His method of demonstrating the phenomenon is by grasping the skin and subcutaneous tissues firmly between the finger and thumb and drawing them away from the deeper layers of the abdominal wall. If hyperalgesia be present the patient winces, and shows his distress by his facial expression. Ligat has mapped out certain limited areas on the abdominal wall in which he established hyperalgesia for other abdominal organs in addition to the appendix. These areas are described by him as follows:

1. That for the gall-bladder is situated where a horizontal line drawn from the tip of the tenth rib crosses a vertical line drawn midway between the nipple line and the middle line of the abdomen.

2. The maximum appendix point is situated at the junction of the upper and middle thirds of a line drawn from the umbilicus to the right anterior superior spine. The fallopian tube point of hyperæsthesia is at the junction of the lowest and adjacent fourths of a line drawn from the middle of Poupart's ligament to the umbilicus. In gastric or duodenal ulcer he locates the maximum point exactly midway between the ensiform process and the umbilicus.

3. That of the small intestine, excluding the first part of the duodenum, is situated in the midline of the abdomen, not higher than a point at the junction of the lower and middle thirds of a line drawn from the ensiform to the umbilicus, or lower than a point at the junction of the upper and middle third of a line drawn from the umbilicus to the symphysis.

In regard to the large gut the maximum point is located centrally in the lower half of a line from the umbilicus to the symphysis.

Ligat's contentions regarding these viscero-sensory reflexes are sound in theory and are based on scientific fact. In practice, however, one finds that one cannot always demonstrate the existence of hyperalgesia. The sign in fact, although it can at times undoubtedly be demonstrated in a very striking fashion, is often absent. The same remark applies to rigidity in the muscles. We may conclude that both these signs are of value when we find them present but their absence does not exclude the existence of visceral disease.

I may also remind you that another area of hyperalgesia may be found to the right of the twelfth dorsal spine: this is accounted for by the fact that here, from the same spinal segment we have the cutaneous distribution of the posterior primary division of the spinal nerves from the same segment of the spinal cord as that associated with the nerve supply to the appendix.

Here let me emphasize the importance of recognizing the fact that pain is produced by direct pressure over an acutely inflamed appendix. It may be true as Mackenzie and others contend that pain is not experienced until the inflammatory process has passed beyond the appendix proper and has invaded the serosa, nevertheless we have here a most important diagnostic sign which must always be borne in mind. Pressure over the acutely inflamed appendix will always produce pain. Hence the importance of a digital rectal examination which will clear up the diagnosis in many a doubtful case, if the appendix is situated in the pelvis. Similarly pain will be elicited on pressure in the loin in a retrocæcal appendix or in the right hypochondriac region if it is lying high up under the liver or again if it is situated, as is the case in rare instances, in the left iliac fossa.

When the inflamed appendix is situated in the pelvis one is likely to encounter bladder complications by implication of that viscus, producing frequency of micturition and referred pain.

We may now briefly refer to the reflex effects produced through the vagus upon other organs. The most common example is that of gastric symptoms with secretory reflex effects. Gastralgia and disturbed gastric function are common. Similarly vomiting and diarrhœa may be attributed to the same cause. So too symptoms referred to the gall-bladder are often encountered and we know how frequently both cholecystitis and appendicitis co-exist in the same patient.

We may in conclusion refer to the conditions which obtain when general peritonitis results with or without gross perforation; here we have a more extensive implication of abdominal reflexes with the characteristic general rigidity of the muscles of the abdominal wall accompanied by vomiting and intestinal obstruction.

I have not referred to the value of blood examinations including not only a leucocyte count but a differential count of the blood elements. This is recognized to be of great importance and often is a determining factor in reaching a diagnosis.

Toxæmia undoubtedly modifies the symptoms to a marked degree, by paralyzing the nerve centres. This is particularly the case with regard to the reflexes through the sympathetic nervous system. In the presence of profound toxæmia these reflexes may be completely in abeyance with entire absence of rigidity, etc., at the same time vagus impulses are no longer active and we have the resultant tympanites and obstruction.

Then too, apart from toxæmia it is possible that, in some instances, the gangrenous condition of the appendix, including as it does death of the nerve elements in the wall of that viscus, may destroy the reflex arc at its inception with results similar to that of toxæmia.

I have not covered this subject in an exhaustive fashion but I have endeavoured to suggest certain lines along which, in the light of our present knowledge, we are able to utilize methods of investigation which will be of material assistance in arriving at a differential diagnosis.

SOME UNUSUAL ABDOMINAL EMERGENCIES

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IN 1912 I read a paper before the Huron Medical Society dealing with the *usual* acute abdominal emergencies, which it is not my intention to repeat at this time, but rather to bring to your attention some unusual abdominal conditions met with.

The first case to which I will refer illustrates to a very marked extent the referred pain met with in some cases of chronic gastric ulceration. The patient, an Englishman, of forty-two years of age, was admitted to a medical division of the Toronto General Hospital with a diagnosis of "angina pectoris". The very typical pain constituted his main symptom, while the complaint of indigestion, i.e., slight abdominal discomfort, belching of gas, and occasional vomiting—occupied such a minor place in his thoughts as to be only brought out by close questioning. The *x*-ray revealed a large ulcer on the lesser curvature of the stomach and he was transferred to my service where a posterior gastro-enterostomy was done, giving complete relief. The ulcer was glued to the under surface of the left lobe of the liver.

Little attention has been paid to those cases of chronic gastric ulcer with adhesions to, and at times excavation of, the liver, where the referred pain in the chest, shoulder, or back, seems to be as characteristic as certain conditions of the liver causing referred pain in the right shoulder.

Mackenzie[1] has observed, in rare cases, symptoms resembling attacks of angina pectoris which he concluded were due to violent peristalsis of the cardiac end of the stomach. The course of the referred pain he took to be up the vagus nerve and down the cervical nerves.

The origin of this referred pain is, however, still obscure. In uncomplicated cases of chronic gastric ulcer a burning ache extends a variable distance up the front of the chest into the neck; this, in the simplest form we term "heartburn." The path of the reflex here seems to be the vagus.

In cases complicated by adhesions to the liver and perhaps excavation of the liver substance, the character of the pain is more traceable to the path of the phrenic nerve and the cervical plexus. So, it would seem, the pain in some cases is due to involvement of the nervous supply of the stomach, while in others it is due to involvement of the nervous supply of the peritoneum covering the liver, the adhesions causing a dragging or a stretching of this structure.

A case (2) which recently came under my care for the relief of an hour-glass stomach presented this referred agonizing pain in the shoulder and back, and as the ulcer involved almost the entire circumference of the upper third of the stomach and was glued to the under surface of the left lobe of the liver with a large excavation of its substance, the cause of the pain may have been either an involvement of the vagus or the phrenic or a combination of the two. The stomach could not be separated from the liver in this case and to relieve the obstruction a gastro-gastrostomy was done. The referred pain was not improved by the relief of the obstruction but was controlled, though not entirely, by medication directed to the surface of the ulcer.

An unusually acute case (3) of pyloric obstruction in a Russian of twenty-eight years of age was admitted to the medical division of the Toronto General Hospital in April last. Here it was thought that he was suffering from an acute appendix, gall bladder or gastric ulcer, and he was transferred to my service for operation. It should be added that the difficulty of diagnosis was increased by his not speaking English. He was suffering intensely with pain in the epigastrium, vomiting repeatedly large quantities of dark brown fluid, in spite of the fact that none had been taken by mouth, and with a visible peristaltic wave passing from left to right across the epigastrium about every two minutes. It was now clearly pyloric obstruction, and as the vomiting did not relieve him, one of my assistants decided upon operation. Gastric lavage was not done. At operation the stomach was found enormously distended and the walls thickened with obstruction at the pylorus. A posterior gastro-enterostomy was performed, giving complete relief. The severity of his symptoms was out of all proportion to what one would expect to find in a case of pyloric obstruction which had been gradually developing during four years. A subnormal temperature and the vomiting of large quantities of dark brown fluid—as much as eighty ounces in four hours, none of which had been taken by mouth—suggested an obstruction lower down in the intestinal tract. The origin of this fluid reveals a most interesting fact, viz., that an abnormally distended stomach, completely obstructed at the pylorus, preventing any regurgitation from the duodenum, with œdematous and congested walls, is

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Read at the fifty-first annual meeting of the Canadian Medical Association, Vancouver, June, 1920.

capable of secreting fluids at the rate of an ounce in three minutes. When such an outpouring of the fluids of the body can occur from the stomach alone, one can readily understand the gravity and extent of obstructive lesions lower down in the intestinal tract, and an explanation for the grave symptoms which occur secondarily to the depletion of the body fluids.

Although the exact nature of an acute lesion within the abdomen is frequently in doubt, the diagnosis of peritonitis is seldom made in the absence of some active pathological lesion. Occasionally referred pain simulates an intra-abdominal condition, as a recent case (4) of a girl of eleven who was admitted into my service at the Toronto General Hospital, and was seen by one of my assistants, illustrates. She had been ill for three days with severe attacks of vomiting and abdominal pain and distention. On admission she was complaining of severe abdominal pain and tenderness and had very extreme abdominal distention. She was restless, with anxious facies, and the slightest touch of her abdomen caused her to scream out. Temperature 103°, pulse 120, respiration 30. The diagnosis of general peritonitis, probably a ruptured appendix with general blood infection, was made and the abdomen was opened, with a negative result so far as finding any pathological lesion. Blood culture revealed a short chain *streptococcus* infection. Her abdominal symptoms were so prominent that they overshadowed the minor symptoms of a general blood infection, resulting in the diagnosis of peritonitis. The patient died the following day and at post mortem no focus of infection was found, although the tonsils were suspected. The case is interesting as showing that one may have symptoms of a general peritonitis in a septicæmia without there being any intra-abdominal lesion.

No. 5 is a unique case of infection with a gas bacillus. Mrs. M., age thirty-six, domestic, white, was admitted on May 7th into my service at Toronto General Hospital; she was always a strong, healthy woman, with four children, youngest eighteen months. Menses two weeks previously, normal. Four days ago had slight hæmorrhage from vagina and some cramplike pains across lower abdomen. She consulted a doctor who gave her morphia. The following day her temperture was 103° and she was slightly jaundiced. On the morning of 5th of May, she had a slight chill, followed by a headache and severe cramplike pains across lower abdomen, and passed about twelve ounces of blood from vagina. She was sent into the hospital suffering, supposedly, with peritonitis, for operation. She had the complexion of a dark mulatto; conjunctivæ tinged yellow; she was delirious and very restless, with dry lips and dry coated tongue. The abdomen was greatly distended, no movement on respiration. tympanitic in front and dull in the flanks, liver dullness diminished. Temperature 105°, pulse 120, white blood corpuscles 56,000. A blood culture was taken and it gave a positive culture of the bacillus ærogenes capsulatus type No. 2, i.e., the bacillus welchi, such as was met with in cases of gas gangrene at the front. The spectroscopic examination of the blood and urine showed sulph-hæmoglobin. The urine was black tarry in appearance, looking like coffee grounds with red blood cells and albumen. The patient rapidly got worse and died in the afternoon. Autopsy report, usual findings of severe toxæmia. The endometrium was greyish, necrotic looking and showed microscopic areas of round celled infiltration extending into the uterine muscle. A postive culture of the Welch bacillus was obtained from all organs. One c.c. of broth culture was injected intraperitoneally into a guinea pig and the pig died in ten hours and the same bacillus was obtained from the pig. Focus of infection, uterus.

No. 6, acute cholecystitis and cholelithiasis, Mrs. G., age forty-two, admitted with a history of having been taken two days previously with severe pain in the abdomen, settling down under the right costal margin, with nausea and vomiting. Temperature then was 101 2-5°. On admission pulse 100, white blood corpuscles 12,000. A mass could be felt extending down from the ninth costal cartilage towards the umbilicus. It felt the size of one's fist, was rounded and very tender. Usual gall bladder incision made and on opening the abdomen the great omentum was found adherent to the anterior wall and wrapped around the cystic duct, completely walling it off from the general abdominal cavity. The omentum was stripped from the fundus of the bladder, which was found to be greatly enlarged, intensely inflamed and with gangrenous areas that were almost at the point of rupture. Stones could be felt within the gall bladder. It was decided to remove it en masse. Accordingly it was separated from the under surface of the liver and the gall bladder tied off, it and the artery being transfixed and ligated en masse. A quarter inch rubber tube was attached to the stump and two large cigarette drains inserted down to the cystic duct, lying against the side of liver from which the gall bladder was removed. There was very little shock, cigarette drains removed on the second day, all drainage removed on the eleventh day. There was a slight discharge until the fifteenth day, patient up on the eighteenth and left the hospital on the twenty-first, making a perfectly satisfactory recovery.

No. 7 is an unusually interesting case. Mr. A. T. R., age sixty, was taken one evening with a very severe gastric hæmorrhage, which caused him to collapse. A few hours later he was so exsanguinated that a transfusion of blood was performed upon him during the night. He made a nice recovery from this and three weeks later, after a transfusion of blood, the abdomen was opened and a large mass felt at the pyloric end of the stomach. A pylorectomy was done with posterior gastro-enterostomy. The tumour at the time was presumed to be malignant, but microscopic section shows it to be a fibroma.

Case No. 8. Mrs. S., age fifty-four, was admitted into the Wellesley Hospital under my care with the history of good health until two days before, when she was taken with severe pain in the abdomen, with a temperature of 103° and a pulse of 120. On examination a well localized mass could be made out on the left side of her abdomen, which was tender to touch, and dull on percussion. She had a leukocyte count of 11,000. My diagnosis was either carcinoma of the descending colon with perforation and abscess, or acute diverticulitis with abscess. An incision proved the former diagnosis to be the correct one, and after evacuating the pus I resected the tumour and eight inches of the descending colon, making an anastomosis between the transverse colon and the sigmoid. The pathological report showed an early adenocarcinoma which had developed in the base of an ulcer of the bowel, and most of the mass was of an inflammatory character. There was no glandular involvement. The patient made a good recovery and is now (eight months after operation) in her usual good health.

Case No. 9. Mr. W., age sixty-eight, had been ailing for a week before he entered the hospital. He had severe vomiting, complete obstruction and a large tumour above the umbilicus. Although the case was practically hopeless, I made an incision under gas anæsthesia, and it disclosed a tumour consisting of the entire omentum, which was gangrenous, and which had come through a hernia in the umbilicus. The gangrenous mass was removed, but the patient succumbed shortly after.

Case No. 10. Mrs. S., age sixty-four, two weeks after a severe attack of erysipelas of the scalp and face was suddenly taken with pain and ridigity beginning in the right iliac fossa, but soon spreading over lower abdomen. A diagnosis of acute appendicitis was made and the abdomen opened. A certain amount of peritonitis was found, with an inflamed appendix, but in addition a rounded soft tumour, size of a grape fruit, attached by a small pedicle to the small intestine near the cæcum. This tumour was evidently growing from the intestine, for in removing it a portion of the intestinal wall was removed with it, leaving a perforation. Dr. Lougheed, the pathologist, reports as follows: "*Frozen sections:* Shows muscle tissue with inflammatory reaction throughout, areas show necrosis and breaking down, tissue shows gram positive coccus with marked round celled polymorph and plasma celled infiltration. *Infected myoma of bowel.*"

Lastly, I should like just to refer to acute diverticulitis as one of the somewhat unusual types of abdominal emergencies. Acute diverticulitis occurs most commonly in connection with the sigmoid, less frequently with the descending colon and rectum. It is usually mistaken for a left sided appendicitis. I operated upon a physician, age fifty-eight, six years ago for this condition and drained an abscess, the perforation of the diverticulum being at the brim of the pelvis. He made a good recovery but developed a fistula, which eventually closed, but opens from time to time.

Dr. Masson recently read a paper before the Ontario Medical Association in which he reported nearly two hundred cases as having occurred at the Mayo Clinic. These cases were mostly chronic ones. If perforation does not occur, acute diverticulitis will form a mass which simulates a malignant growth. I have had several cases of this kind. It is possible now, with the x-ray, to diagnose diverticulitis without difficulty.

Reference:

1. MACKENZIE, SIR JAMES.—"Symptoms and their Interpretation," 1909, page 131.

NOTES ON DRAINAGE IN SURGERY

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THE selection of such a common place subject for presentation perhaps needs some justification. One finds that interns often have very widely differing ideas as regard to drainage, and as a man is when an intern so he will be after leaving the hospital. In general, interns would keep drainage in too long. In my own time as a resident, tubes were left in much longer than they are now, and after the tubes were removed the patients were daily tortured by re-inserting packing for fear the wound would close too soon and thus entrap some pus. The too general a continuation of the custom probably still exists. This is the justification for the choice of the topic.

In this brief note we will not discuss the problem of when to drain and when not, but merely what materials to use and how long to leave the drain in.

When a drain is inserted into the tissues it causes irritation. Irritation causes the formation of fibrous tissue, which mats together tissues not intended to be firmly attached to one another. New formed fibrous tissue contracts and thus causes a crippling of the part whether it be a hand or a belly. Moreover, fibrous tissue, unless at perfect rest, will not absorb. Therefore, the crippling of the part will be permanent and the gloomy part of it is that it tends to get worse. The sequence is, foreign body, drainage, irritation, adhesions, fibrous tissue, contractions, interference with function, gradually gets worse. Thus it is evident that the problem of drainage is one of no little importance.

Purpose. It may seem scarcely worth while to speak of a matter that is so perfectly self-evident as the purpose of drainage. To clear the ground for discussion, however, it is probably wise to raise the point.

The purpose is to drain out some physiological or pathological liquid or semi-liquid material, which, if retained in the body, would prove detrimental. This liquid may be very watery in its consistency or it may be quite thick. On the fluidity of the discharge depends somewhat the kind of drainage.

To show that it is not a pathological fluid *per se* that is to be drained off, one has only to mention extravasated urine. In itself it is not pathological. But we will speak only of drainage of pus.

It may be postulated that pus under tension is the dangerous thing, not merely the presence of pus. An appendix filled to the point of great tension often gives nearly as much temperature and other untoward urgent symptoms as a whole bucketful of pus free in the belly. A chest full of pus only needs to have the tension taken off to produce a marked and rapid change for the better without in any way, for the time being, making the absorbing area any smaller. The tiny pus cavity at the root of a tooth is known to be the cause of all too much trouble. Why so? Because it is so located that it is under considerable tension.

Granted that pus under tension is the *bête noire*, not merely the presence of pus, the essential thing in the operation is not to get all the pus out, but to provide a good exit for it. The one time custom, not yet dead enough, of diligently curetting off the inside of the wall of an abscess should be stoutly condemned. The all too common and deadly operation of curetting the lining of a septic womb has been the cause of many an untimely demise. The late John B. Murphy was wise to the point when he said, regarding general peritonitis, "Get in quick and get out quicker." He quit traumatising the belly cavity by trying to get out all the pus, he merely provided a hole to relieve the tension of the pus and he reduced the death rate from 95 per cent. to 5 per cent.

Drainage should be efficient, i.e., should give easy exit to the pus. To this end (1) It should usually be in the most dependent part. (2) Usually one opening is sufficient if the pus is in a distinct cavity. (3) It should not damage the tissues. (4) It should be kept in as short a time as possible. (5) In exposed parts drainage should cause as little permanent disfigurement as possible.

The materials used for drainage may be enumerated as follows, glass tubes, rubber tubes, rubber tissue, gauze, silk-worm gut, cat gut and silk. Glass tubes were formerly used extensively in abdominal cases. Methinks many fæcal fistulæ of twenty years ago were directly traceable to the glass drainage tube. Why? Because first, the tube was too hard and too resistant to the nearby coils of bowel, and second, the tubes were left in too long. Glass tubes are not much in favour to-day except in the occasional case where a primary fæcal fistulæ is made. There a Paul's tube is occasionally used.

Rubber tubes are much to be preferred in comparison with glass tubes. The damage caused by pressure from rubber tubes whether it be on viscus, muscle, vessel or nerve should be almost negligible

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Read at the Manitoba Medical Association, November 19th, 1920.

provided it is not left in too long. The definition of "too long" will be discussed later.

Rubber tissue used in various ways alone, or enclosing gauze, allows a thin liquid to drain out fairly well but prevents the exit of thick discharges. It fulfills one function of drainage very well, viz: that of preventing union of the superficial tissues before a pus sinus has been established.

Gauze drainage is about as efficient as is rubber tissue and not more so. The meshes of gauze are soon filled with the thicker part of the discharge and so it is soon reduced to being a mere plug to keep the superficial tissues from uniting prematurely. Gauze soaked in vaseline is much to be preferred to plain gauze in many cases. The living tissues enter the meshes of the plain gauze and in twenty-four hours the foreign body may be literally "grown" into the tissues. The removal of the drain will do actual damage to the tissues as well as give the patient undue pain.

It is well to mention here the distinction between drainage and packing for gauze is sometimes of great use as packing and nothing else can well take its place. By packing is meant the filling of a cavity. This is most frequently done to stop oozing or free bleeding. A bone cyst which has been curetted out may need to be packed with punch and mallet. In a case of inevitable abortion gauze packing placed about the cervix can scarcely be bettered. An operative surface that continues to ooze is benefitted much by spreading out gauze packing. The gauze should not be vaselined for its open meshes encourage coagulation. Packing is not drainage.

For the drainage of small, superficial cavities a bundle of strands of silk-worm gut does very nicely. Its use is rather limited however, being chiefly of advantage where the discharge is very liquid, such as an outpouring of serum or slight oozing of blood.

Cat gut should be mentioned only to be condemned. It so soon becomes soft it really is an excellent culture medium. Any site where it could be used silk-worm gut can just as well be used. The latter is firm and does not encourage the growth of organisms. Cat gut should not be used at all as drainage. Silk is more desirable than cat gut but not to be preferred to silk-worm gut.

The rubber tube is the usual drainage material used to-day. It will be just as well to say just a word further about it. It is variously made ready to admit the pus into it from the cavity to be drained. One is frequently surprised at being handed a tube with holes cut in its sides from one end to the other. The slightest knowledge of physics will make it clear that one cannot syphon water if one uses a rubber tube with holes in it throughout its length. And so one cannot hope to get pus out of a pelvis through a tube with holes more superficial than the level of the pus.

Of course if a tube, which is square on the end, goes to the bottom of the pus cavity the discharge may not find its way into the tube. The simple method of splitting the tube, for perhaps an inch, will give ready entrance of the discharges.

Special Points. Where a viscus has been opened and again repaired any drainage inserted should be carefully placed a little distance away from the line of suture. The mere contact with the line of suture encourages leaking and may very readily be the undoing of an otherwise good operation.

In general it may be said that in abdominal cases it is well to drain through the operative incision. For a retrocæcal abscess due to an appendix, a drain in the loin is advisable. In the case of the pelvis, however, it is rarely necessary or wise to drain a pus cavity through the vault of the vagina if the operation has been done by the abdominal route. The less advantageous drain through the abdominal wound answers the purpose very well.

How long should the drain be left in the abdomen? It is undoubtedly only forty-eight hours at the most till the tube is draining merely the sinus in which it lies. That is the time to remove it. Should the mouth of the sinus have gauze put in? If so, why? I see no reason why it should and believe it should not be done. The drainage of a gall bladder is done for a special reason and the tube may well be left in longer. The same may be said of a suprapubic cystotomy.

In the case of the chest there is an entirely different problem to that met with than in most places. Elsewhere the cavity quickly ceases to be a cavity by the closing in of its walls. Not so the pleural cavity. Its outside wall is rigid and cannot collapse. The inside wall, the lung, is all too slow in expanding and so the cavity is slow to close. The skin will heal over before the cavity is obliterated and, therefore, before drainage is complete. This is one of the few places where a pus sinus will close before its work is completed. Therefore, the same must be kept open by keeping in a tube.

Drainage in the tissues of the extremities, except where pus is beneath a muscle, is best carried out by gauze, or gutta-percha tissue. If there is oozing of blood from the incision, moist gauze may be used to promote coagulation and thus stay the bleeding. Otherwise gauze soaked in vaseline, or gutta-percha tissue is best used, such drain being more readily removed without causing undue pain. In any case the drain should be removed in twenty-four or not later than forty-eight hours at the most. The purpose of the insertion of any drainage material in the extremities is largely that of preventing union of the skin until a pus sinus has been established. Where the pus has to pass beneath a muscle a rubber tube will be necessary, otherwise the muscle will cause enough obstruction to the exit of the pus to cause it to collect under pressure.

When the tube can be dispensed with it is preferable to do so. Its pressure on the tissues is greater than that of gauze and damage to a certain extent will occur.

THE PRACTICAL VALUE OF A METABOLISM CLINIC

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THE study of metabolism in clinical medicine is essentially a consideration of nutrition,—the constituents and uses of foods, their oxidation in the body and their elimination.

One seeks to know the chemical and vital changes that occur in the body, and what effect food-stuffs have on the structures and functions of cells and viscera. Energy production is the result, and the total metabolism is expressed in terms of heat (calories).

Clinical medicine takes up the subject where physiology left it, endeavouring to find the limits of the normal,—the limits within which variations in function are insignificant, or where dangerous.

Basal metabolism expresses the minimal heat production measured on the fasting stomach and during repose.

Among the most important studies in this subject is the chemistry of the proteins estimated chiefly by the waste products in the urine, that of fats and carbohydrates on the other hand being expressed in terms of the respiratory quotient.

It is a remarkable fact that while the care of the digestive system is of prime importance to health, yet no system is relatively more ignored in practice.

We habitually talk of the diabetic diet, of the obesity diet, of nephritic diets, and of the typhoid diet, as though foods were administered by rule equally for all cases. As a matter of fact, the food values are determined for each individual case in ever-changing proportions, for on this basis alone can rational feeding be administered.

Diets should be prescribed as are drugs, watched from time to time in the course of disease, and changed in detail according to their need.

Fortunately for human beings, the human machine is so evenly balanced that in the healthy body only the grossest digressions cause obvious harm. Nevertheless, the ordinary dietetic errors of everyday life inevitably induce functional changes, which, if persistent, create serious pathological lesions.

Let us take, for example, the protein foods of everyday life which are normally dismembered in the intestines and hydrolyzed to non-poisonous amino-acids. If these proteins be imperfectly split in the intestines, bodily poisons may be developed and even reach the blood, in which case they might be excreted by the kidney, and the kidneys easily suffer.

It is in just such cases as these, then, that a simple modification of the diet would not only cure such a disturbed function, but protect the kidneys from increasing disturbance.

What is obviously needed is more education in respect of food-stuffs,—education of the physician, of the nurse, and of the patient.

It is surely most important that a nurse should know that stewed and boiled meats are better than fried ones, and why this is the case,—that there are methods of making foods digestible, inexpensive, and simple, that under certain conditions water is needed in abundance, and that at other times it should be restricted.

As a matter of fact, there has been far too much empiricism, and not enough scientific study in the matter of dietetics in practice, and it is not without reason that someone has said, "In the course of years perhaps the food of the sick man may be as scientifically administered as that for animals on a modern farm."

Nor is it any less curious that we do not as yet know what must be regarded as essential food-stuffs. The theory has obtained until quite recent times that all the food-stuffs essential to life were expressed in the broad groups, proteins, carbo-hydrates and fats. To-day, however, we have come to learn that there are other essential ingredients, without which the functions of the body cannot be carried on for any length of time, viz. the essential amino-acids and the vitamins.

Some years ago Eijkman discovered that beri-beri was induced by the taking of rice without its pericarp, and that the addition of this portion of the food removed the symptoms. Very small quantities of these vitamins, indeed, are essential to health, and vital to growth, but their influence upon secretions and metabolism generally is apparently all-important.

In the same way, epinephrim is essential to life, even though it exists in the very minute proportions of 1 to 100,000,000 in the blood.

Food values, then, are not all-important in the limited sense hitherto commonly employed. It has moreover been amply shown that all proteins are not of equal food value, some being defective in the essential amino-acids, while others are not utilizable by the human body. For example, the protein of mushrooms never leaves the intestinal tract, while that of gelatine is not utilized by the body, but can only spare body nitrogen. Efficiency depends upon the power for repair, and this in turn directly upon the quality and quantity of food. Analogous examples of the importance of food values are found in the so-called deficiency diseases (scurvy, rickets, pellagra, beri-beri).

Not the least interesting of these studies concerns the effects of various proteins in asthma, hay fever, skin lesions and epilepsy. I. C. Walker, among others, has found that in the wide distribution of proteins throughout Nature, there are many to which people are sensitive, or anaphylactic. These proteins,—pollen, food, and bacterial,—may at times enter the digestive or respiratory tracts, and light up the manifestations of disease. Food proteins he found to be a frequent ætiological factor in asthma, his patients being variously sensitive to egg protein, or cereal grains (wheat), milk, etc., and not uncommonly sensitive to many at the same time, especially in youth.

These tests for sensitiveness are readily made on the skin, producing, when applied intracutaneously in Na hydroxide solution, reactions of an ephemeral urticarial character. The treatment of the disease consists in desensitization if possible; otherwise avoidance of the respective protein involved.

Application in Diseases of Kidney. The importance of proteins as a factor in disease is best shown in diseases of the kidney, and nowhere more strikingly demonstrated than by the recent work of Newburgh, who in a series of experimental cases induced definite renal lesions by the adminstration of high protein diets, over relatively short periods of time.

Metabolic studies have contributed immensely to our knowledge of nephritis, its detailed diagnosis, its prognosis and its treatment, and have pre-eminently taught us to regard function in the kidney as of greater importance than anatomical structure.

This question of function moreover is an interesting feature of prognosis. Thus, for example, to know how the renal tissues deal with urea and the N end-products in general, how the salts are excreted, to what extent other end-products of metabolism are removed,—this is a matter of chemical analysis, and the information thus obtained in the laboratory not only adds to our knowledge of the type of disturbance and its prognosis, but contributes in no small measure to our methods of treatment, medicinal and dietetic.

Renal Diagnosis. We have already stated that metabolic studies have done much to advance the problems of functional diagnosis. In other days it was our custom to describe samples of urine as normal or abnormal according to their constituents. To-day we know that there is no such thing as a "normal urine". It is well to consider the urine as the end product of an attempt on the part of the body to keep the blood normal. As everyone knows, the presence of albumen and casts, and the tests for urea now in vogue in ordinary practice, give very little accurate information of renal disease or function. Nevertheless, tradition dies hard, and these tests still remain the methods of election.

The function of the kidney is essentially to excrete the waste products of metabolism, to preserve normal concentration of body fluids, thereby maintaining normal chemical reactions in the body. In other words, it concerns response to changes in circulation, and the power of the kidney to adapt itself to ever-changing conditions.

Functional Tests. As a matter of fact, no single test is suitable for a complete estimate of kidney function. In association with the history and physical examination, a series of tests gives one much more light, and these tests repeated at intervals show the improvement or retardation in the function of the kidney. From their findings the proper dietetic control can be instituted.

The Phthalein test, it may be urged, is *per se*, a sufficient guide for renal diagnosis but while this is in some respects true for surgical conditions, it does not hold in the various forms of nephritis. A normal phthalein excretion may be present when there is a serious lesion and vice versa, with comparatively little renal disease, the excretion may be very much diminished. Frequently an abnormally high night rate of excretion, over 80 per cent. in 2 hours is present, which shows hyperactivity.

Wherever possible it is obviously more satisfactory to employ the following *Group of tests* as being of the greatest use in determining kidney function.

1. The Phthalein Test to determine approximately total function.

2. The Nephritic Test meal (Mosenthal). This determines the relative volumes of day and night urines, the elasticity of the kidney as demonstrated by the specific gravity range and the power to concentrate N at night.

3. The determination of renal concentration of urea one and two hours after taking 15 grms. of urea by mouth. This recent test has been advocated with much satisfaction by Hugh MacLean of England.

4. The Ambard co-efficient: The study of the rate of urea and chloride excretion in relation to their concentration in the blood.

5. Or one may do as W. R. Campbell suggests and use the simpler water tests and dry diet, determining the general functional powers of the kidney for excretion and concentration.

In any event the essentials are to estimate the concentrating power and to determine in part where the lesion exists.

Characteristic pictures are thus obtained of normal kidney function, of signs of disease in cardiac kidneys, of acute and chronic nephritis. Also one is able to differentiate the pseudo-nephritis of anæmia from a true nephritis.

Treatment. Where N retention exists a low protein diet is of prime importance, favouring as it does urea excretion; nevertheless, a limit exists to this treatment inasmuch as an insufficient protein diet causes withdrawal of protein from the body tissues, in order that sufficient metabolism may go on to maintain life.

One feature in the treatment of N retention is here worthy of note, viz., the encouragement of diuresis. Increased water intake favours N excretion and to that extent the older idea of flushing out the kidney bears some weight. The indiscriminate application of this principle, is, however, to be condemned, for with hypertension excess of fluids adds to the blood volume thereby increasing the pressure and adding to the danger.

Salt Retention and Nephritic Œdema. The metabolism of salt in nephritis is not well understood. We know that it is closely associated with the development of œdema. Normally, if the chlorides in the plasma fall below the concentration of 5·62 g.p.l. no salt is present in the urine. That is the reason why the chlorides disappear from the urine in pneumonia, only to return with the crisis.

In nephritis when there is difficulty in the elimination of chlorides the threshold is usually raised often to 6·00 g.p.l. or higher. By restricting the salt intake, the threshold will tend to drop towards the normal level, the excess at the same time passing out of the blood stream.

In many cases of so-called chronic parenchymatous nephritis, or nephrosis, associated with extensive œdema, the chlorides are frequently retained in the tissues, there actually being a very low plasma chloride. In these cases it is often difficult to hasten the return of the chlorides into the blood stream so that they can be eliminated with a corresponding diuresis.

Investigations with results of treatment are best exemplified by the subjoined tables—illustrating the course of improvement under properly controlled therapy.

CASE 1.—ACUTE NEPHRITIS. Male, Age 30. Weight, 76 kilos.

Date	Volume Night Urine	Concentration of Nitrogen at night	Blood Urea	Rate Urea Excretion McLean's Index.	Chloride Threshold grams per litre.	Phthalein 2 hours	Remarks
Normal	400 c.c.	1·0%	0·4	80–150	5·62	65–75	
March 9th, 1917 (Adm.)	720	0·30%	0·54	15	6·00	30	Œdema of legs. Hæmaturia.
April 3rd, 1917	645	0·68%	0·36	83	5·71	72	Albumin—4 gms. per litre. Casts.
May 16th, 1917 (Discharge)	400	1·03	0·25	135	5·67	81	Alb. a trace. No hæmaturia.

Blood Pressure: Systolic 130: Diastolic 70.

Diet	Date	Diet	Salt	Fluids. c.c.
	3–6–17	Restricted Protein.	Salt free	1500
	3–14–17	Protein, 52; fat 73; CHO 118.	Salt free	1500
	3–20–17	Protein, 64; fat 86; CHO 187.	Salt free	1500
	4–11–17	Protein, 80; fat 90; CHO 250.	Salt free	1500

CASE II.—CHRONIC NEPHRITIS Male, Age 55. Weight, 66 kilos.

December 3rd, 1916 (Adm.)	620	0·38	1·53	5·2	6·38	trace	Œdema of lower limbs Albumin 8 gm. per litre.
June 22nd, 1917	500	0·60	0·585	23·5	5·67	57	Abumen—trace.
February 10th, 1919	490	0·92	0·39	38·	5·61	58	
July 3rd, 1920	460	0·89	0·51	58·	5·77	60	

Blood Pressure.

Date	Systolic	Diastolic
Dec., 1916	140	100
June, 1917	126	80
Feb., 1919	130	80
July, 1920	120	80

Diet:

Date	Diet	Salt	Fluids c.c.
Dec., 1916	Low protein	Salt-free	1000
June, 1917	Restricted protein.	Salt-free.	2000
Feb., 1919	Restricted protein.	Salt-restricted.	1500
July, 1920	Restricted protein.	Salt-restricted.	1500

Diabetes: Statistics. 164 cases have been treated to date, a series which has enabled one to form conclusions on this disease when treated with all possible scientific care. Through Allan's studies the disease itself is better understood. Cases are now detected much earlier, and thereby dietetic treatment is instituted more quickly and with immensely greater benefit. The duration of life is much longer and mortality is lessened. Cases are often quite arrested, if not cured.

Finally, complications are more easily avoided and treated, and surgical conditions that arise are handled with more intelligence and with better results.

This is perhaps most striking in the case of adults, many of whom have lived for more than fifteen years in good health. Moreover, in children whose mortality hitherto has been lamentably high, and with whom in former years the diabetic life was reckoned in months, it is now prolonged into years.

One of our cases has lived to three and a half years in tolerably good health. Indeed, for children this newer method of treatment gives to it the semblance of a new disease, such conditions not having existed before.

The routine method at present usually adopted for all diabetics (without urgent acidosis) on admission, is as follows:

1. Observation diet is given. (1·5 gr. protein p. kilo. body weight. 1 gr. CHO p. kilo and with fat enough to make 20-25 calories p. kilo.)
2. One-half observation diet is given.
3. Fasting till sugar free (except for chicken broth and three times boiled vegetables and bran cakes).
4. Determination of CHO tolerance upon green vegetables, increasing 10 g. CHO daily till glycosuria two days in succession on same CHO intake.
5. Fast till free from glycosuria (rarely more than one day needed).
6. One-third trial maintenance diet (1–2 days).
7. Two-thirds trial maintenance diet (1–2 days).
8. Trial maintenance diet, containing 1·5 g. protein p. kilo, one-half CHO tolerance as determined under 4. Fat enough to make 20-25 calories p. kilo.
9. Changes above 8, p.r.n.

To this preliminary treatment is added the progressive care till exit, and includes education of patient in special dietetics and caloric values, training in urinalysis and some cooking.

Acidosis. Where acidosis exists, metabolic studies enable one to deal with diabetes more intelligently and to treat the disease with far greater success

Newer methods have contributed not only in accurate knowledge, but have enabled us to judge of prognosis and thus avoid much of the anxiety incident to cases where our ignorance previously had left us in doubt.

The results most successful in treating cases with acidosis may be summarized as follows:

1. Rest in bed.
2. Free catharsis.
3. Forcing of fluids up to 5000 c.c. daily.
4. Fasting.
5. Careful observation of the degree of acidosis by the simple method of van Slyke. (CO_2 volumes per cent. concentration in blood.)

Under unfavourable progress, the fast is broken by small quantities of protein (egg-white), and if necessary sodium bicarb. is administered orally, per rectum, and, as a last resort, intravenously. Preliminary gastric lavage early if vomiting occurs.)

In one instance 103 g. sod. bicarb. was given by mouth, etc., resulted in raising CO_2 volume per cent. from 19-31, thus bringing the patient from the verge of coma to safety.

Hyperglycæmia. Added interest has arisen through more careful study of the sugar content of the blood, and much has been contributed to our knowledge of differential diagnosis, and not a little to therapeutics thereby. Hyperglycæmia and lowered sugar tolerance are factors of importance in many diseases.

Sciatica, for example, in many cases is definitely associated with and probably caused by defective carbo-hydrate metabolism. There may be no sugar in the urine, but the concentration in the blood may be abnormally high. For example, in one of our cases with persistent sciatica, the fasting blood sugar was ·113 per cent., and was raised after 100 g. of glucose to ·274 per cent., and the patient voided ·9 g. of sugar. Dietetic treatment rapidly relieved the condition.

In many cases of glycosuria associated with *syphilis*, hyperglycæmia is found, and the sugar tolerance is reduced to normal by approrpriate treatment. In one of our cases the tolerance was raised from 60 g. of carbo-hydrate to 135 g. in ten months.

A very remarkable series of cases has recently been described in which the hyperglycæmia of *chronic arthritis* (·326 per cent.) has been relieved and the disease even cured by dietetic course which aims to relieve lessened tolerance for carbo-hydrates, when the focus of infection has been relieved.

The procedure now in many of these cases of chronic arthritis is to remove focal infections when present, and at the same time treat the patients largely as one would in cases of diabetes, endeavouring to raise the tolerance for carbo-hydrates.

Our methods, then, have changed, and protein diets are allowed, where formerly they were condemned. In one of our patients with chronic arthritis deformans, a focal infection in the teeth and the bladder were relieved, the fasting blood-sugar was ·144 and raised after 100 g. of glucose to ·308. He voided 7·57 g. of sugar, and yet under appropriate treatment the condition was much relieved.

In all forms of glycosuria, whether diabetic or otherwise, the most important feature of the treatment is to free the urine from sugar by dietary measures.

These are but a few of many fields of usefulness for chemical investigation. The paths are open in all directions and yield fruitful results.

Basal Metabolism, at present, has a limited clinical application in medicine, more especially in observation of endocrine function, chiefly in thyroid disturbances, where its results aid in diagnosis, prognosis, and in consideration of surgical possibilities. In fact, it is the only accurate means of control in comparison with other tests at our disposal.

And so, the answer is given to those who recognize in metabolic studies naught but scientific amusement, or a pastime of research without practical results.

The metabolism clinic is in its infançy, and every modern medical service is tending more and more to have as its chief feature the chemical and physical study of patients as a *sine qua non* for diagnosis and treatment.

THERAPEUTICS

Some New Concepts in Digitalis Therapy.

EGGLESTON, C.: *Amer. Jour. Med. Scien.*, 1920, Vol. CLX, p. 625.

THE author first reviews the recent advances in the clinical pharmacology of the drug. The effect of digitalis on the heart rate is most noticeable in the fibrillators, but there is also a definite slowing, though not so marked, in those with normal rhythm. In the latter group vagus stimulation is responsible for a large part of the slowing, but there is also some increase in the conduction time. In auricular fibrillation the slowing results from a partial A-V block, with an elimination of the weaker auricular impulses, but the drug has little effect on the auricular rate. Digitalis also has a direct action on the myocardium. This is evidenced by the alteration of the T wave and there is every reason to suppose that the ventricular extrasystoles produced by digitalis arise from a direct action of the drug on the heart muscle. These facts represent our present knowledge of the direct action of digitalis on the heart. The effects on the blood pressure are variable, but the tendency is for the pressure to be altered in the direction of normal, with an increase in the pulse pressure (difference between systolic and diastolic). High blood pressure is not of itself a contraindication to digitalis therapy. So also in angina pectoris, there is no evidence that digitalis increases the spasm of the coronary arteries, and in many cases it may do good. Finally digitalis exerts a diuretic action only in the presence of œdema arising from a failing circulation; it has no direct action on the kidneys.

Digitalis is indicated in every case of cardiac failure, no matter what the cause. The dosage is identical and should be to the point of a minor intoxication with the drug. Nausea and vomiting are the most important of these signs, and their appearance should be a signal for a sharp reduction in the dosage. The drug may be administered in small doses (m.xx-xl of the tincture four times daily) when four to six days are required for the digitalization of the patient, or in larger dosage, when one to two days only are demanded for the saturation of the individual. In these cases a drachm of the tincture is given every six hours for four doses, then a half-drachm every four hours during the day and none at night. The latter dosage should be maintained until full digitalization is secured. The drug is then discontinued or its rate of administration greatly reduced. Eggleston emphasizes the necessity of constant supervision during the use of these large doses. The preparation selected should always be one which has been assayed biologically, and proved to be of high activity. The dried leaves and the tincture are the most stable and the most easily administered. Proprietary specialties are not superior to a high-grade official preparation, and their cost is often exorbitant.

Digitalis is rapidly absorbed after oral administration, but is excreted relatively slowly, and its action on the heart may persist for periods of two weeks or longer after the drug has been stopped.—D. S. LEWIS

THE PRESENT-DAY CONCEPTION OF HAY FEVER*

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IT is hardly necessary to define the term "hay fever" since the disease is so common that everyone is quite familiar with the symptom-complex with which this term is associated. Nevertheless, there are so many other conditions in which this group of symptoms is predominant that it may be wise to restrict the term to those cases in which the ætiological factor is the pollen of one or more plants. Barker[1] defines the disease as "a more or less severe inflammation of the mucous membranes of the nose, throat and bronchi, occurring in susceptible persons in the spring or in the autumn and caused by the inhalation of pollens of certain plants."

Historical. It was not until 1873 that Blackley[2] as a result of careful researches, called attention to the periodicity of the disease, and definitely established the relationship existing between the attacks and the presence of certain pollens in the air at these periods. In 1905 Dunbar[3] confirmed Blackley's observations and extended them. He introduced the method of treatment by the use of pollen, but believed that his extract of pollen was a true toxin which, upon inoculation into horses would call forth the production of antitoxin. This immune serum he called Pollantin, and used it in an attempt to produce a passive immunity in the patient. The results have not been sufficiently favourable to warrant the adoption of the method.

Since then, many investigators have devoted long and careful study to this disease and *active* prophylactic immunization by means of pollen extracts has definitely been established as the best method of treatment at our command.

Protein Sensitization. In individuals who manifest a hypersusceptibility to a protein, the administration of such protein, either hypodermically or intravenously, gives rise to a more or less violent reaction which may manifest itself by symptoms of profound shock, an attack of asthma, or the symptom-complex of hay fever. Sometimes these symptoms may be brought on by the mere ingestion of the offending protein, or by its absorption through the mucous membranes of the nasal passages and bronchi. It has long been held by many observers that these phenomena are of the nature of anaphylaxis. More recently, observations on drug hypersusceptibility in which there is no protein element, have cast some doubt upon the adequacy of this explanation. The writer had occasion to test a patient (a physician) in Walker's clinic, complaining of asthma and eczema, in whom the attacks were brought on while administering arsphenamine. Cutaneous tests with a solution of this drug yielded a result comparable in every way to those obtained in cases sensitive to proteins. Quinine has also been found to produce a similar result in suitable cases. Coca[4] urges that the term anaphylaxis be restricted to instances where the result is shown to be due to an antigen-antibody reaction, and claims that a true case of anaphylaxis in a human being has never yet been reported. He suggests the term "allergy" to cover all instances in which there is no proof of an antigen-antibody reaction. The term is by no means a new one but his suggested restriction of its use is new. A full discussion of this question is not within the scope of the present paper and it will be necessary to content ourselves with the statement that while the majority of investigators still favour the anaphylaxis theory to explain the phenomena of hay fever and bronchial asthma, there are serious objections which will have to be satisfactorily dealt with before the question is finally settled.

The table on following page taken from Walker[5], is an excellent means of visualizing the various causes of hay fever and their relationships to each other. The non-sensitive cases are nearly always due to bacterial infection and should not properly be called hay fever. These cases are characterized by a more tenacious type of secretion rather than the typical thin, watery discharge of true hay fever. Moreover, the eyes are less commonly affected and the whole picture more closely resembles an ordinary coryza, or common "cold". It is not difficult to conceive of such a phenomenon occurring during certain seasons of the year,—particularly in the autumn and winter. It may also be present more or less continuously throughout the year. Cases of so-called spasmodic vasomotor rhinitis occurring as a result of the presence of abnormalities of the nasal passages and sinuses are comparatively uncommon, and as Barker suggests, "the physician should protect the hay fever patient from the useless nasal operations of over-zealous surgical enthusiasts!" There are, nevertheless, certain cases presenting symptoms *simulating* non-seasonal hay fever, which are relieved after the removal of polyps or other gross abnormalities.

Read before the Hastings County Medical Society, October 13th, 1920.

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Seasonal Sensitive Cases. During April and May the various trees pollinate,—each variety requiring approximately two weeks or less to complete the process. Therefore if an individual is sensitive to willow, for example, the attack will last only a very short time and specific treatment will not be worth while. If, however, the patient is sensitive to a number of pollens which are shed at different times, the attack may last for a considerable period, and prophylactic inoculation may be advisable. Such cases are comparatively rare.

The next pollen season begins in early June and lasts until the later part of July. During this time the grasses shed their pollens. It is true that other pollens are also met with in this period, for example, that of the rose and of the daisy, but these seldom cause hay fever, in spite of the popular belief as evidenced by the familiar terms "rose cold" or "rose fever". The chief cause of the disease during this season is the pollen of timothy, with that of June grass and red top ranking next. The term "hay fever" in its narrow sense should really be restricted to the cases occurring during this period,—since it is only at this time that the pollens of grasses used in making hay are the causative agents.

Classification of Hay Fever (Walker)

- Sensitive Cases
  - Seasonal
    1. tree protein
    2. grass protein
    3. compositæ protein
    4. animal hair protein
    5. bacterial protein
    6. food protein
  - All the year
    1. animal hair protein
    2. bacterial protein
    3. food protein
- Non-sensitive Cases
  - Seasonal
    1. bacterial infection
  - All the year
    1. bacterial infection
    2. abnormalities of nasal passages and sinuses

The third and most important pollen season begins in this country about the twentieth of August,—often a few days earlier. It lasts until the first heavy frost, which usually occurs the first week in October. During this season the chief offender is the pollen of ragweed. Occasionally golden-rod and daisy are found to be causal agents. It is true that very often in testing the patients for sensitiveness all three pollens are found to yield a positive result, but almost invariably that of ragweed causes by far the strongest reaction, with golden-rod a poor second and daisy faintly positive. Since these plants are related, such findings are believed by most competent observers to be an example of "group reaction," so familiar to bacteriologists. If this interpretation is the correct one, the reactions caused by golden-rod and daisy are in the majority of instances to be disregarded.

There are a certain number of sensitive cases in which pollens are shown not to be the cause even though the disease occurs in certain seasons only. Such individuals will react to one or more of the proteins of foods, animal dandruff, hair or feathers, or bacteria. With respect to the last mentioned, attention should be drawn to the point made by Walker, that bacteria may cause symptoms simulating hay fever in two ways; (1) by a sensitiveness to the bacterial proteins (2) by virtue of the infection by the micro-organism. The latter element was considered earlier in this paper, in referring to the non-sensitive cases. In all these instances, the seasonal incidence would have to be accounted for by a seasonal exposure to the particular protein concerned. This is readily understood in the case of certain foods and animals, and in the case of bacteria it would seem that infection somewhere in the body at stated seasons of the year would have to precede the appearance of hay fever symptoms due to a susceptibility to the protein of the organism present. An example of a seasonal hay fever caused by a food protein is described in the paragraphs discussing methods of diagnosis.

Where the proteins of animal hair, foods, and bacteria are the causal agents of hay fever symptoms, the disease is *usually* non-seasonal in type. The total number of cases caused by these proteins is comparatively small, as for some unknown reason the symptoms produced by susceptibility to these substances are nearly always asthmatic in nature. Hay fever symptoms are fairly frequently found, however, in persons riding horses or fondling pets, such as cats and dogs. Zinsser[6] cites the case of a laboratory attendant who always was seized with violent sneezing attacks, with running of the eyes and nose whenever he handled guinea-pigs in the course of his work.

Symptoms. In those who are affected with hay fever, the disease makes its appearance every year at aproximately the same time. It begins as an irritation of the nasal and conjunctival mucous membranes, with itching and sneezing as prominent symptoms. In a very short time, the eyes begin to water profusely, and there is a thin watery discharge from the nose. A cough is sometimes present, and in certain cases, asthma develops sooner or later in the season. There is often marked mental depression, with inability to concentrate the mind. General malaise, headaches and insomnia are sometimes marked symptoms, and in severe cases the disease is of the most distressing character. During the attack the nasal and pharyngeal mucous membrane is rendered so irritable that dust or smoke will serve to aggravate the condition produced by the protein to which the patient is sensitive. The symptoms persist until the end of the period of pollination of the particular plant or plants concerned. As pointed out before, the season for the trees is quite short, but the grasses begin early in June and last until late in July. The ragweed season begins about the middle of August and ends with the first heavy frost. Not a few patients are sensitive to both grasses and ragweed. In such cases there is little respite from June to October.

Methods of Diagnosis. The methods employed in the accurate diagnosis of the disease rest on the basis of the observations of Dunbar[7] and others, that in sensitive subjects, the mere placing of the offending pollen upon the slightly abraded skin will cause a local reaction as evidenced by the appearance of a wheal and a surrounding area of erythema. The actual technique as now employed is as follows: a series of very slight scratches with a sharp scalpel are made on the ventral surface of the forearm. These scratches or cuts should not be deep enough to draw blood, and not longer than an eighth of an inch. They should be placed about one inch apart. The one nearest the elbow is left untouched as a control. A small amount of a suspected pollen is placed on the first abrasion, and dissolved by adding a drop of N-100 sodium hydroxide. The next scratch is treated similarly with another pollen, and so on down the arm until all the pollens which might reasonably be expected to be capable of causing symptoms at that season of the year, have been applied. In the average case one notices, within a few minutes, a red areola appearing around the abrasions treated with the offending pollens. In the centre of this areola, about the scratch, a wheal will be observed which gradually increases in size The test is considered complete after thirty minutes, but it is usually unnecessary to allow the solutions to act longer than fifteen minutes.

Some observers prefer to inject solutions of the pollen protein intradermally instead of performing the cutaneous test as outlined above, but there are valid objections to this method. Chief among these is the fact that it is often difficult to differentiate a slight positive reaction from a negative one, as the injection of any solution into the skin necessarily gives rise to a wheal of certain proportions, due merely to the bulk of the fluid. Other objections will be considered in taking up the technique of estimating dosage in treatment.

While the diagnosis of hay fever may usually be made from the symptoms complained of by the patient, there is likely to be, nevertheless, quite an appreciable percentage of error if more accurate methods are not employed. Cases complaining of symptoms simulating seasonal hay fever may present themselves, and the diagnosis seem to be so obvious that sensitization tests appear superfluous. Such a case was tested by the writer in the clinic of Dr. I. Chandler Walker at the Peter Bent Brigham Hospital in Boston, and is cited by the latter in his recent paper[8]. This case, a housewife, complained of sneezing, watery secretions from eyes and nose, and general symptoms of coryza during the summer only. The history of her case did not differ materially from that usually obtained from patients sensitive to both the grasses and ragweed. Tests with the pollens, however, were entirely negative, and in subsequent routine tests with animal and food proteins, she was found to be sensitive to the proteins of wheat. We were at a loss to explain the periodicity of her trouble on this basis until she volunteered the information that every summer she takes a position as baker in a summer hotel. Apparently the ingestion throughout the winter of wheat bread and other foods containing wheat flour is not sufficient to produce symptoms, but that added to the amount of wheat protein breathed into the nostrils during the mixing of pastry, etc., pushed her over the threshold.

Treatment. Specific protein treatment. The most successful method of treating hay fever has proven to be the prophylactic inoculation of the patient with the specific protein causing the disease. Solutions of the pollen protein are made, grading the dilutions of the protein from 1-500 to 1-20,000 or higher. A preliminary test with the various dilutions is made by placing a drop of the solution on a scratch on the skin, having as many scratches as there are dilutions of the pollen. The initial dose (hypodermic) of the pollen will be 0·1 c.c. of the dilution next higher than the last one giving a positive skin test. Suppose 1-5000 gives a faintly positive test; the schedule of treatments would then be 1-10·000 give 0·1 c.c., 1-5000 give 0·1 c.c., 0·2 c.c., 0·1 c.c., 1-1000 give 0·1 c.c., 0·2 c.c., 1-500 give 0·1 c.c., 0·2 c.c., 0·3 c.c., 0·4 c.c., 1-100 give 0·1 c.c. and 0·2 c.c. (Walker).

Some workers use the intradermal injection of the various dilutions to determine both the diagnosis and the degree of sensitiveness. Not only does this method produce a slight wheal from the injection itself, but even comparatively inert substances may produce effects which are only with difficulty differentiated from a slightly positive test. For this reason this method is not to be depended upon to determine the initial dose to be administered in the process of desensitization, whereas the cutaneous method lends itself admirably for this purpose.

The treatments should be given one week apart, and should be completed by the time the season begins. *Therefore the course of inoculations should begin three months before the attack is expected.* Such a course of treatment should protect the patient for that season, and the schedule will have to be repeated each year,—at least for a few years.

In cases sensitive to animal hair, a similar routine is carried out over quite a long period until the skin test shows the patient to be no longer sensitive to strong solutions of the protein. The most satisfactory method of treating food cases is simply to omit such food from the diet. Abstinence for a year or more often results in an automatic desensitization of the patient, who may then add the food to the regular diet without ill effect.

Climate. For those who are able to do so, a sojourn during the hay fever season in one of the resorts which are free from the offending pollen will usually prove efficacious. Muskoka and the Georgian Bay are free from ragweed, although some golden-rod is found. Generally speaking, however, the autumn cases do well in these localities.

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THERAPEUTICS

Administration of Large Doses of Digitalis in Cardiac Diseases. Warfield, L. M.: *Wisc. Med. Jour.*, 1920, Vol. XIX, p. 235.

Warfield emphasizes the importance of an active preparation, the necessity of standardization, and the use of a sufficient dose to produce one or more of the minor signs of intoxication—nausea, vomiting, slowing of the pulse, partial block, coupled beats, etc. For safe therapeutic dosage the schemes of Eggleston and of Robinson should be combined, and the total dose be calculated on the basis of 0.1 c.c. of tincture per pound of body weight. To produce best results the dose should cause a slight nausea. The problem is to bring the patient to this stage at the earliest possible moment, and then to stop the drug. He advises an initial dose of from 10 to 20 c.c. of tincture. (In this dosage we scarcely agree.—Ed.) If this produces nausea the full dose has been given and the drug is stopped. If no symptoms are produced then half the initial dose is given after six hours, a quarter of the initial dose six hours later and a fourth quarter after another six hours, and so on, until digitalization has been secured. The drug is stopped whenever nausea appears.

He urges caution in the administration of large doses, both as regards previous digitalis therapy (within ten days), and also in cases of auricular flutter. The presence of flutter should be suspected when the pulse is below 100, is regular, and yet there are all the signs of decompensation. A maximum dose of 4 c.c. every four hours until effects are noted would be safer in such cases.

Small doses are useless in most cases. With the larger dosage effects should be present within ten to thirty-six hours. D. S. Lewis.

Elimination of Carbon Monoxide from the Blood After a Dangerous Degree of Asphyxiation, and a Therapy for accelerating the Elimination. Henderson, Y. and Haggard, H. W.: *Jour. Phar. and Exper. Therap.*, 1920, Vol. XVI, p. 11.

All trace of carbon monoxide gas disappears from the blood within a few hours after the removal of the patient to a fresh air supply, the CO being displaced by oxygen; and yet signs of functional derangement and structural degeneration may persist for months. These effects are the result of tissue asphyxia while the gas is still in the victim's blood. In dogs there is a vigorous hyperpnœa during the development of asphyxia, and thereafter, due to deficient oxygenation and other causes, there is a diminished production of CO_2. This results in a relative apnœa, so that for half-an-hour after animals are exposed to fresh air there is a marked depression of breathing. During this period the rate of carbon monoxide elimination is slow, and the condition of tissue asphyxia is continued although the body is surrounded by fresh air. They suggest that this period of continued asphyxia may be of great importance in producing the sequelæ of gas poisoning and should be shortened as much as possible.

Oxygen inhalation during this period has only a slight effect as it is not adequately inspired. Inhalation of CO_2 diluted with air has an immediate effect, it augments the breathing and doubles the rate of carbon monoxide elimination. The use of CO_2 diluted with oxygen gives even more rapid elimination of the carbon monoxide, the oxygen displaces the CO and functional restoration is correspondingly accelerated. They hope to carry this method on to a practical application. D. S. L.

TWO CASES OF PELLAGRA IN CANADA

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THE incidence of pellagra in temperate regions has become more and more evident as the disease has become familiar in such climates, and it seems likely that many unrecognized cases are being treated in Canada for other troubles, simply because the condition has never been drawn to the attention of the general practitioner. This has happened elsewhere, for example the first case in Massachusetts was observed in 1862[1], and from that time until 1910 the literature is a blank. Then Fitzgerald[1], Dean, Lee and McDonald each had a case, and since that time pellagra has become commonplace. In Canadian literature I can find only two examples, namely those reported by Rolph[2] and Pinault[3], one being discovered in New Brunswick, and the other in Ontario.

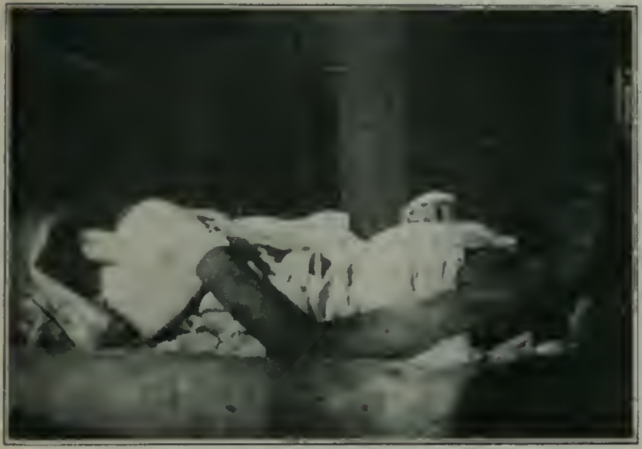
The first case, which I saw in consultation on April 27th, 1920, was admitted to the Sherbrooke Hospital in the service of Dr. George Hume and was diagnosed by him. The patient was a married woman age twenty-one, who had lived in England all her life until she came to Canada in August, 1919. She was confined in September of the same year of a normal child. Her occupation previous to coming to Canada was assistant in a grocery shop. She was always a small eater, but preferred a mixed diet, and never ate maize in any form. Her chief complaints were abdominal pain, diarrhœa, headache and sleeplessness. Her personal history was good with the exception of occasional attacks of diarrhœa, but these were never associated with skin lesions.

The present illness began in February, 1920 with weakness and headache; then pain after eating, indiggestion and diarrhœa. Vomiting was present once or twice early in the course of the disease. Later she had marked stomatitis with stripping of the epithelium, leaving raw surfaces particularly under the tongue. She also had a hot sensation in the mouth but taste remained unimpaired. Her appetite was poor, the diarrhœa was severe and accompanied with pain, and the stools contained pus and bloody mucus.

When first seen she was in a wretched condition, emaciated and pale, except where the skin was affected with the rash. This rash was symmetrical on the neck, hands, wrists, feet and ankles. She said it looked like sunburn at first, but by the time she reached the hospital the skin had become hard and was desquamating, leaving a pigmented surface, cracked and bleeding in places. The finger nails and toe nails were discoloured and loosened from the nail bed in part, as if they would soon fall off. The headache was marked, but there was no photophobia. The knee-jerks were gone on both sides, and the plantars were active. The abdominal reflexes were gone except at the left upper segment. The Wassermann was negative. Blood count, R.C. 3,500,000, Hgln. 50 per cent., W.B.C. 18,000, Diff. Ct. slight increase in polynuclears, otherwise normal. Blood pressure D. 65, S. 98. The patient was running a temperature of 101° to 104°, but on April 30th she passed a lot of pus by rectum and the temperature dropped to normal, and was never quite so high again. Through May and June it ran 100° to 101°, and on July 6th it finally reached normal and remained there. She very gradually improved on Goldberger's diet and arsenic, though she remained sleepless and very irritable. The rash faded and new nail growth replaced the old. The patient was discharged well on October 22nd.

I was called in to see the second patient on September 20th and treated her at the Sherbrooke Hospital until October 10th when she died. She was a married woman, age forty-two, who had not lived with her husband for several years. She had two children in good health and never had a miscarriage. She had always lived in Canada within a short distance of Sherbrooke, and was always employed in housework. Her appetite was never good, and for some years she thought that she could not eat eggs or fruit. Corn meal rarely entered into her dietary. For several years she had been troubled with headaches, indigestion and depression of spirits. For some months her mouth had been sore, with a red tongue and loss of taste. Early in the summer she thought she got sunburned, although her daughter who was equally exposed showed no signs. A symmetrical erythema developed on the arms, extending from the insertion of the deltoid to the wrist, and from the wrist to the finger tips, the same appearance was noticed on the back of the neck. The redness faded and the rash left a dark desquamating surface. She then developed abdominal tenderness, and painless diarrhœa, with blood and mucous in the stools. About September 1st she complained of dizzy spells, and felt as if she was drawn down to the floor. Weakness of the extremities developed chiefly on the left side, and finally she had to go to bed.

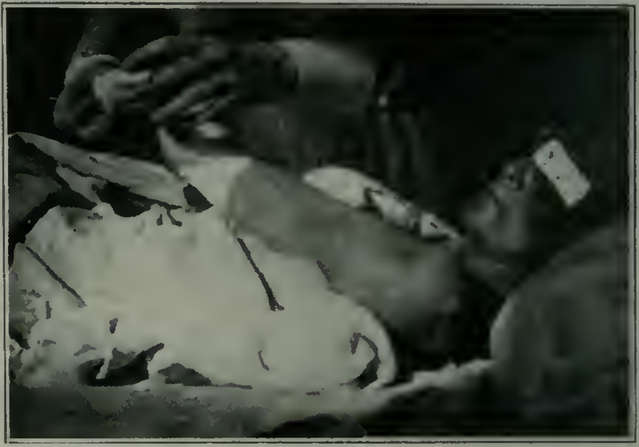
Examination showed an emaciated woman with listless expression and dull mentality. The most noticeable feature was the dark brownish staining of the skin extending from the upper arm to wrist, desquamating and bleeding in the folds of the elbow and on the edge of the discolouration. Contrary to the patient's statement the rash extended far on to the inner side of the arm where it would be practically impossible for the sunburn to reach. Further examination revealed the same condition on the back of the neck, and smaller areas on the knees and ankles while the skin of the hands was very thick and wrinkled with a tendency to crack and bleed. The mouth presented a painful stomatitis with peeling of the mucous membrane under the tongue, and a few red ulcerated patches at the tip. The abdomen was tense and tender. There was a constant, slight, foul, discharge from the enlarged uterus; a diagnosis of cancer of the uterus having been made by another physician some months before. The thoracic viscera were normal, and no enlarged glands could be found on the body. The mental attitude was dull, gradually becoming worse, latterly excited, with delirium and restlessness requiring restraint, and finally followed by coma and death. The knee jerks were exaggerated with a sluggish plantar reflex on right, and Babinski on left. There was a left ankle clonus, and the abdominal reflexes were gone. There was a general weakness but no paralysis. The fundi were normal. Blood count, R.C. 2,800,000, Hgln. 45 per cent., W.B.C. 8,000. Differential count normal. Blood pressure D. 70, S. 95. The patient was put on Goldberger's diet, but it was evident from the first that the case was hopeless. After refusing food and becoming rather violent she lapsed into coma and died, October 10th.



Case. 2—Pigmentation about left elbow and neck.

Both of these cases were typical pellagrins. They had the cardinal symptoms of "bilateral erythema appearing rather suddenly on exposed surfaces of the body followed by desquamation; diarrhœa, stomatitis, changes in the reflexes, altered sensation and irritability, tremors and psychic abnormalities."[4] Though the second case was complicated with cancer this is not unknown, as in the case reported by R. C. Bryan.[5] I was also fortunate in being able to show both cases to Dr. Gooding of Barbadoes who has had an extensive experience of the disease, and who was able to corroborate the diagnosis.

It was self evident that before a rational treatment could be adopted we had to know the ætiology of the trouble, and we had several theories to consider. In our cases we could exclude the maize theory, and Sambon's theory of the biting fly (Simulium), so we adopted the view that pellagra was a food deficiency disease, and used Goldberger's diet with increased rations in fresh eggs, milk and meat.



Case. 2—Limit of pigmentation on upper arm.

Enright[6] concludes that more factors than food deficiency are involved in the origin of the disease, but our present knowledge points to the conclusion that pellagra does not exist without a food deficiency of one kind or another.

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FOCAL INFECTION WITH SPECIAL REFERENCE TO MEDICAL INSPECTION OF SCHOOLS

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WHILE acting as medical school inspector during the past year in a country district in the province, the writer was impressed with the very great prevalence of defective teeth, and of abnormal nose and throat conditions, among the children attending the public schools. He felt that he would be of most use, not only in preventing disease, but also in improving the general health of the children, if he could induce their parents to have local abnormalities about their head corrected. He is now endeavouring to put in writing the reason for this belief.

While attending the post graduate vacation course in medicine in Edinburgh in 1908, our attention was drawn to the danger of a septic mouth being the cause of pernicious anæmia and of other impoverished blood conditions. And how often do we find obscure symptoms of ill health, both physical and mental, and obscure soreness in the tissues, joints, muscles and nerves, and even a beginning enlargement of the thyroid gland, in an individual with lessened resistance, give way to attention to the teeth, or other focus of infection. Dr. Charles K. P. Henry, of Montreal, writing on this subject, says, "It is accepted that local foci of infection, often small in extent, insignificant in appearance, and often without local symptoms, are the unsuspected causes of obscure symptoms of systemic disease, and may even lead to remote lesions which are frequently fatal."

Let us attempt to elucidate this new idea in pathology by answering some questions concerning it. And first, what are the more serious diseases, believed to have their origin in germs entering the system from these foci of infection? These are acute rheumatic fever (acute arthritis), endocarditis (the form that acute rheumatism takes in the child), chorea, chronic rheumatism (chronic arthritis or fibrositis), myocarditis, pericarditis, nephritis, acute and chronic, gastric and duodenal ulcer, appendicitis and cholecystitis.

Next, where are these foci of infection located that are blamed for causing such serious and intractable abnormal conditions of the body? They may be located anywhere in the body, but are usually in tissues communicating with a mucous or cutaneous surface. Infection of the teeth and jaws, with the development of dental pyorrhea, and alveolar abscess, infection of the faucial and nasopharyngeal tonsils, and accessory sinuses are the most common foci of infection. Other sites are the gall bladder, appendix and chronic infection of the genito-urinary tract, including salpingitis, vesiculitis seminalis, prostatitis, cystitis and pyelitis.

What gave rise to this theory, and how do we know that it is correct? A better understanding of bacteriological processes and of modes of infection led to the knowledge that the so-called infectious or contagious diseases were due to germs, and also to the elucidation of the carrier problem in disease, as well as to the theory we are at present discussing. Thus ever since Pasteur's germ theory of disease was accepted, some fifty-five years ago, there has been a tendency to look more and more to individuals as harbouring disease germs, rather than to think that we catch the germs primarily from our surroundings, however unsanitary those surroundings may be. The knowledge of focal infection, however, is more particularly due to the work of clinical observers, and bacteriologists working together in the wards and laboratories of the hospitals in Chicago. Frank Billings* and his associates carried on this work for some years, and with Rosenow's experiments on animals, they proved their theory conclusively. A fresh culture of the streptococci from a case of human appendicitis when injected into the vein of a lower animal, such as a rabbit, produced in a large percentage of cases, typical appendicitis; not only so but a similar culture taken from the tonsil in a case of tonsillitis believed to be the cause of the appendicitis in that individual, when similarly injected, also caused appendicitis. The same type of bacteria could be obtained from all the lesions. Similarly by using a culture of the streptococcus viridans taken from a case of endocarditis in man, they produced similar lesions in the endocardium of the dog. By such painstaking experiments many times repeated have they added much to this part of medical science.

The result of treatment—the eradication of the focus—also in many cases helps to prove that the focus and the systemic condition bear the relation of cause and effect.

How do the germs in the focus get to the various parts of the body? Principally through the blood, but also by the lymph channels, and at times by contiguity of tissue. An example of the vascular route: the

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Read at the annual meeting of the New Brunswick Medical Society, July, 1920.

* Many of the ideas in this paper are taken from Dr. Frank Billing's book entitled, "Focal Infection."

ptococcus rheumaticus that causes the rheumatic manifestation, whether that manifestation be an arthritis, a myositis, a neuritis, an affection of the heart structures, or a chorea, or an attack of erythema nodosum passes from the primary focus in the mouth through the blood vessels to the site for which it has an elective affinity. When the maxillary or cervical glands are enlarged, the ætiological primary focus being in the head somewhere, the bacteria have passed along the lymphatic route. In acute glandular fever from which many children suffer, the infecting micro-organism from the inflamed throat passes rapidly through the cervical lymph channels and glands with resulting bacteriæmia and fever. Although this disease apparently occurs in epidemic form, it is probably more liable to attack those children who have diseased throats.

When the incidence of abnormal dental and throat conditions is so great, why are not more individuals seriously diseased? No doubt more of the diseased conditions that we are called upon to treat, are due to focal infection than we are aware of. Perhaps occasionally some other physician finds the ætiological focus. Nevertheless, the fact of their very frequent presence compared with disease, does not necessarily disprove the theory. For, although probably ninety per cent. of us have a latent tuberculous focus, usually of the cervical, mediastinal or mesenteric lymph nodes, still comparatively few develop marked tuberculosis. Again, many more individuals have chronic gonococcal infection of the prostate gland, the seminal vesicles, or the fallopian tubes, than develop gonorrheal arthritis, or the other occasional systemic manifestations of this germ.

Then again this infection long continued or frequently repeated, may produce a certain amount of immunity, so that the individual carrying the focus is not inconvenienced perhaps, until exposure to cold, the exhaustion and debility due to physical and mental overwork, or old age, so lowers the resisting power, that bacteria entering the circulation from the focus of infection, are capable of producing acute and chronic systemic disease. We do well to keep in mind the lesson given us by Pasteur some forty years ago. To prove that fowls whose temperature is higher than that of man, are not normally susceptible to anthrax, he inoculated the animal with the specific germ after the fowl had been placed in cold water. The disease developed, but when the temperature again rose to normal, after the fowl was removed from the water, the symptoms of the disease rapidly disappeared. The exposure to cold and dampness then, merely allows the bacteria in the ever present focus of the rheumatic and in his blood to gain the ascendency over the lowered resistance of the individual. The pneumococcus from the mouth of the individual himself or from that of a carrier, that is the prominent actor in the terminal infection of old age, or of a chronic diabetic, is an illustration of the same idea.

How are we to diagnose the presence of a focus of infection? The focus of infection may or may not cause local discomfort. When a systemic disease occurs which present-day knowledge leads us to believe is due to a focal infection, we should try every means to locate the focus. A full medical history of the patient should be obtained. In making a full and complete physical examination the services of a specialist may be required to examine the nose and throat and probably other sites. In pyorrhœa and sinusitis the *x*-ray is necessary. To quote from Dr. Henry's article in the July, 1920, number of The Canadian Medical Association Journal, "The most dangerous varieties of dental sepsis are pulpless teeth and blind abscesses." These abscesses are pumped into the blood or lymphatics every time we chew food. "Their frequency is beyond dispute. At the Forsythe Dental Infirmary 40,000 abscessed teeth were found in 50,000 children examined. Langstroth found at the University of California Hospital sources of chronic infection in 84 per cent. of ulcer cases, in 66 per cent. of subacute arthritis, in 73 per cent. of chronic arthritis, and in 100 per cent. of gall-bladder cases. Thoma in his chronic medical cases found alveolar abscesses in 88 per cent." Almost any organ in the body may get infected from this source.

Still quoting Dr. Henry, "From the tonsils we often get remote arthritis, secondary adenitis, septicæmia, endocarditis, bone abscesses, and secondary anæmia. The tonsils showing the largest amount of infected material are often small, atrophic, with smooth red surfaces, and yet contain virulent pus, with the streptococcus hæmolyticus or viridans as pure cultures therein. So innocent do they appear on examination, that often they are dismissed as unlikely to cause trouble."

How difficult it sometimes is to find and treat the ætiological focus may be illustrated by the following case. A middle aged gentleman saw me in the summer of 1919 suffering from inflammation of the great toe, following repeated cold water bathing. His history showed that he had at times some not very well marked rheumatic symptoms, and that he had been having attacks of tonsillitis. Examination of his urine showed some albumen with casts. There was no cardiac hypertrophy and his blood pressure was rather low than high. His general condition was much below par. After consultation removal of his tonsils was recommended. It was not, however, until after he had been examined by medical men in two of the large medical centres on this continent, that a diseased wisdom tooth was found and extracted, and all of his infected tonsillar tissue removed. When the tooth was removed, the rheumatic symptoms got worse. After two days the pains and aches progressively improved. (With many bad teeth in an individual with lowered resistance, care must be taken not to remove too many teeth at one time for fear of dangerous or even fatal poisoning of the system.) After the removal of the tooth and of every vestige of tonsillar tissue, he gained about twelve pounds* in weight and felt correspondingly better. Examination of his urine indicated a less severe type of nephritis. He remembers having had rheumatic symptoms for about fifteen years, and believes that his tonsils were affected for even a longer time.

What can be done in the way of treatment? The public, especially children, should be taught the necessity of cleansing the mouth, teeth and throat of all particles of food after eating, as a preventive of local infection, decay of teeth, and general disease. In children the tissues of the mouth and other sites of infection in the head are very susceptible to infection. If these are kept free of streptococci there will be less danger of rheumatism, chorea and endocarditis. When the teeth of the child are already decayed, either the temporary or the permanent teeth, they should be either filled or removed. The extraction of abscessed, and of all dead teeth, as a preventive measure, with light curettement of the infected bone appears to be advised by the ablest men. The following interesting case was recently reported to me by a friend, a dentist. A young professional lady musician with considerably enlarged cervical glands on both sides, was in such a condition physically and mentally, that she gave up her work. On consultation with her physician, the dentist suspected some crown and bridge work, and a radiograph confirmed his diagnosis. Three weeks after extraction and light curetment she was rapidly improving, and a month later was prepared to take up her work again. As Dr. Henry says, "uneasy lies the tooth that wears a crown."

Greatly enlarged tonsils and adenoids in the child should be removed so that the sinuses may be better drained, and be less likely to become diseased. Dr. Henry, quoted above, says that "after the correction of dental defects many tonsils regain their physiological function, and become a dam instead of a sieve for bacteria." However, when a tonsil is actively diseased complete removal appears to be the only safe procedure.

This province last year appointed medical school inspectors not only in the larger centres but also in the country districts, who have great opportunities for advising preventive work along this line. I understand that later, clinics will probably be provided for country districts, where extraction of teeth and the opinion and treatment by dentists and other specialists may be given free, a work resembling that at present being, I believe, successfully carried on at the expense of the Red Cross in the neighbouring province of Nova Scotia. This work is in accord with the spirit of the age which, in the words of Sir Auckland Geddes, is endeavouring "to secure equal opportunities of health (as well as education and advancement) to rich and poor, high and low."

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*After this paper was written, the patient reported that he had gained twenty pounds in all.

SUTURE OF CIRCUMFLEX NERVE

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PARALYSIS of the deltoid muscle constitutes a severe disability. While it is true that the supraspinatus and the clavicular fibres of the pectoralis major acting in conjunction with the trapezius and the serratus magnus assume a compensatory action, this is at best incomplete. In certain cases the patient learns by a trick movement to throw the arm outward and upward from the chest wall and once the arm has passed above the axis of the pectoralis major to use this muscle in thus holding it.

Bunts[1] in a carefully prepared article full of interest has reviewed the history of nerve injury about the shoulder joint: Galen, we learn, refers in his *Officini Medici* to Erasistratus who in 300 B.C. made mention of this complication in luxations of the shoulder.

In civil life injury to the circumflex nerve is usually subcutaneous, a sequel to dislocations of the shoulder, falls on the shoulder or more rarely to the use of a crutch. It has been described in miners whose manner of work necessitates prolonged lying on the side.

In the war isolated injuries of the nerve were very seldom met with. Benisty[2] writing on this point says: "As in several hundreds of cases of peripheral nerve lesions we have never come across isolated paralysis of the circumflex nerve such cases must be rare." I have been able to find but few cases reported and a prolonged search through the literature, including the Index Medicus, has thus far failed to discover a case in which the nerve has been sutured.

Report of Case

Private M., age twenty, was wounded on August 8th, 1918, by an exploding bomb, several small fragments of which entered his left shoulder and neck. Immediately after the injury the patient lost the power of movement in his left arm, with extensive sensory impairment, ascribed to a lesion of the brachial plexus. His wounds healed promptly without surgical intervention. Under appropriate massage and electrical treatment the paralysis and anæsthesia markedly improved and by the time of his admission to the Granville Canadian Special Hospital, Buxton, England, on November 7th, 1918, he had regained the use of all the muscles of his arm with the exception of the deltoid. The notes on admission state that there was no evidence of fracture nor of vessel injury but there was marked atrophy of the deltoid and he was quite unable to abduct the arm.

Lt.-Col. F. H. Mackay, who was in charge of the medical division, made a careful examination on November 16th and reported as follows:

"*Deltoid.* No response to faradism; slight response to galvanism: reacts to 1·0 microfarads, condenser current.

"*All other muscles* respond quickly to faradism and to galvanism.

"All *voluntary power* present save in use of deltoid where no voluntary power is present.

"*Sensation:* Slight area of hypo-algesia over outer surface of arm, circumflex area."

Having noted the presence of a small scar at the back of the shoulder, he made and recorded his diagnosis as a "lesion of the circumflex nerve from small foreign body entering the deltoid muscle," and requisitioned an *x*-ray "to show foreign body about neck of humerus." The *x*-ray (Fig. 1) duly demonstrated the presence of the offender lying posterior to the surgical neck of the humerus, reminding one of the story of the discovery of the planet Neptune, whose existence and precise location were revealed through its disturbing influences.

The patient was kept under observation and treatment for a further period of two months without signs of improvement and the response to galvanic current was found to be diminishing; he was accordingly transferred to the surgical division "for removal of the foreign body and suture of the nerve if possible."

On January 23rd, 1919, twenty-four weeks after injury, operation was undertaken. Under ether anæsthesia an incision was made along the posterior border of the left deltoid, which was carefully reflected upwards, and a cube-shaped metal fragment smaller than a pea was found beneath the deltoid close to the humerus. The circumflex nerve and vessels were isolated as they issued from the quadrilateral space. The nerve was carefully freed distal to the branch supplying the teres minor and was found to end in a small bulbous enlargement close to the site of the foreign body. By what must be regarded as good fortune, branches, three in number, were identified in the muscle substance beyond the lesion, which had evidently occurred just at the point of division of the nerve. These branches were loosely bound together with very fine catgut and the freshened ends anchored to the vivified proximal portion. Accurate end-to-end approximation by the usual method was

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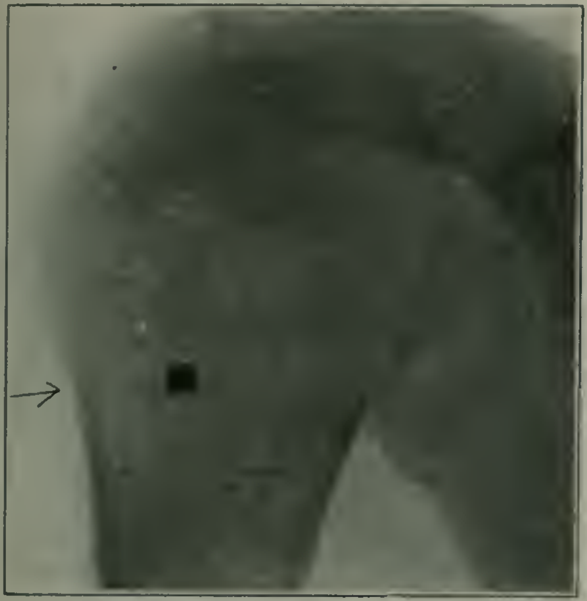
Read before the Montreal Medico-Chirurgical Society, March 19, 1920.

impossible owing to the small size of the nerve, but a measure of continuity was restored, and the ends remained in apposition without tension even when the arm was fully abducted. The deep fascia was closed with catgut, the skin with silkworm gut, and the arm bound in full abduction on a splint. Following healing by primary union the stitches were removed on February 3rd. On February 12th the deltoid reacted to 2·0 microfarads, condenser current. On February 22nd, twenty-nine days after operation, the patient was re-examined by Mackay who recorded the following observation: "Now voluntary power in deltoid to slight degree, with rapid recovery." On February 27th, five weeks after operation, he had power in the deltoid to the extent that he was able while in the recumbent position to move the arm from the side laterally to a right angle, and when standing upright to hold the arm horizontally against gravity. The sensory impairment had almost disappeared. He was boarded for invaliding to Canada and continued to gain strength in the muscle up to the time of his departure.



Left Shoulder Joint
Note Foreign Body which Injured the Circumflex Nerve

If we disregard the lesion to the brachial plexus, which was transitory, and possibly due to hæmorrhage above the clavicle, the resultant injury in this patient was due to a complete division of the circumflex nerve. The clinical picture before operation clearly indicated this—the deltoid paralysis and the area of hypoalgesia in the sensory supply of the nerve. It is well recognized that complete division of the nerve may produce but slight sensory disturbance owing to the associated supply from supra-acromial branches. Tinel[3] writes in this connection: "Sensory disturbances are somewhat reduced in paralysis of the deltoid. Seldom do we find complete anæsthesia; as a rule we simply have more or less hypoæsthesia of the external surface of the shoulder." The operation fully confirmed the clinical findings.

At the time of operation the prognosis was regarded as unpromising owing to the small size of the nerve and its branches, and the recovery came as an agreeable surprise. The rapid regeneration and early return of power is of special interest and is doubtless explained by the short distance the regenerative process had to travel.

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THE RELATION OF PHYSICAL EXHAUSTION TO CHRONIC ILL-HEALTH

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We all come across many patients who give an indefinite history and a long list of complaints. While the symptoms are numerous, on physical examination, very little if any actual disease is found. It is true that in a few cases some trifling disorder is found which is blamed for a long train of symptoms. Sometimes the appendix, occasionally the gall bladder, or frequently a slight perineal or cervical laceration or uterine displacement receives the blame. Where no abnormality is discovered the patient is told that he is run-down or anæmic or nervous. At first these patients are generally treated with tonics or bromides and are placed on a diet as a matter of routine. The patient generally tries this treatment for a while and as his personal habits were not altered the improvement if any is only of a temporary nature. When the patient returns with his complaints more extreme measures are considered. In those cases with slight localized abdominal pain, or when there is any other abnormality present such as above-enumerated, surgical interference is recommended. After the operation the patient feels well for a short time, then a relapse occurs. The surgeon then wonders why about 50 per cent. of the operations for the relief of symptoms are failures. The so-called run-down patients are advised to go to the country for a rest and those complaining of aches and pains are sent to bathing resorts. These patients return much improved and feel well for a short while. A few patients are taken to a hospital for observation and experimentation. These also leave the hospital much improved. In the course of a few months nearly all cases have relapses. When these patients come back with their old complaints they are then labelled as neurasthenics.

These patients may be divided into definite groups based on the symptoms present, as the gastro-intestinal type. They complain of anorexia, fulness in the epigastrium after eating, pyrosis, eructations, borborygmi and constipation. The causes of these symptoms may be traced to their mode of living.

A man works fifty-five hours a week, ten hours a day, week days and five hours on Saturday. Many men, however, work all day Saturday as well as several nights a week. This man usually resides some distance from his factory. He rises at five o'clock in the morning and does not eat any breakfast because he has no appetite or time to eat. He must leave his house not later than a quarter to six so as to allow a margin for tramway troubles and yet be able to reach his factory before seven. He starts work on an empty stomach and continues till twelve noon, then he stops for half an hour or an hour for lunch. The lunch that he brings with him was prepared the night before and is generally not very attractive or wholesome, but as he is tired and hungry he eats as a hungry man usually does, he eats fast, does not masticate his food but manages to fill his stomach. His lunch time is soon over and he rushes back to his work. At half past five or six in the afternoon he ceases work, rushes out of the factory, squeezes into a stuffy car, and if there is no breakdown in the tramway service he arrives home around seven o'clock in a tired and depressed state. Such a condition is not conducive to a good appetite, nevertheless he eats his supper. When he is through with his supper he finds a little work to do around the house or else he amuses himself by reading or attends a cinema show or a union or lodge meeting. When he is ready to retire for the night it is usually eleven o'clock or later. From eleven in the evening to five in the morning he obtains six hours of rest when not disturbed. On analysis one finds that this man rested for six hours, spent two hours in very bad air in street cars, worked ten hours, passed two or three hours in bad air at a picture show, theatre or meeting hall and had but two indifferent meals which he did not eat properly, in the twenty-four hours. The young and robust stand this life for a while. The let up in the week end, half holiday on Saturday and Sunday help to tide the person over for a while, but sooner or later a break occurs and the stomach, having been punished most, is naturally the first to suffer. The patient begins to complain of indigestion, he consults a doctor who prescribes some medicine, places him on a restricted and easily digestible diet. The patient improves for a while but it does not last long for we all remember the fable in which the heart and stomach were at war, a restricted diet is not suitable for a man doing hard work. He comes back, with his complaints, to the physician who on examination may find slight localized pain or a pain may develop through mental suggestion. The attention of the patient becomes fixed on some slight abnormality which increases in proportion as the physician lays stress on slight localized abdominal pain, and operative interference is accordingly advised. After the operation the patient feels fine, which is really due to the enforced rest and proper feeding as well as to the leading of a more natural life. But as soon as he returns to his old habits, a relapse occurs and the old symptoms return.

Clerks and business people form the anæmic and rheumatic type. They usually complain of headache, backache, lumbago, anorexia, and weakness. On examination they are found to be anæmic and the muscles of the back and legs are found to be tender. These cases are diagnosed as either anæmia or rheumatism depending on the attitude of the physician, whether he lays more stress on the anæmia or pain. In the anæmic cases iron tonics are prescribed and in the rheumatic cases liniments and ointments are prescribed. In both varieties of cases there may be a slight improvement for a while. When they come back the physician sends the so-called anæmic cases to the country and the rheumatic cases to mineral bath resorts. These patients after a prolonged stay in the country or after taking numerous baths return much improved, in fact cured, but in a few months or even weeks the old condition returns. A simple explanation for these ailments may be found in the living conditions of these people. The clerk rises at seven in the morning, has a slight breakfast or none at all, rides to work in a stuffy street car for about an hour and reaches a stuffy office at nine o'clock. He works till twelve and has an hour for lunch, which he eats in a crowded dining-room or else he is standing up at a lunch counter when there is no room at the tables. He eats as fast as he can, then has a smoke and goes back to his stuffy office where he works till five. He then squeezes into a stuffy street car and reaches home about six. He then dresses for dinner and by the time he is ready to eat, he is all fagged out and has lost his appetitte. This is the result of vitiated air and perhaps of bad posture which these people often maintain during their working hours. In the evening he spends several hours at some form of recreation or amusement, retiring generally not before midnight. The result is that these people do not obtain sufficient sleep, and rest only six or seven hours a day and take an insufficient amount of nourishment. They therefore rise in the morning tired, and begin the day in a physically exhausted state. In time nature begins to call for a halt to this mode of living by inducing the train of symptoms enumerated.

Sales people generally complain of pain in the legs and in the sacral region, these cases are disposed of as being lumbago or rheumatism. They are treated with plasters, liniments and ointments with indifferent results. The explanation for the persistence of these pains is very simple. These people start to work at eight o'clock in the morning and work till seven in the evening with one hour off for lunch. On Saturday they work till eleven in the evening, with one hour off for supper. As most of the stores keep open other nights during the week it follows that these people are on their feet for at least ten hours a day, while in most cases they are on their feet for thirteen or fourteen hours a day without a proper rest. The stores are generally poorly ventilated, and in some of them the rays of the sun never enter to brighten the environment or to dry up the damp, humid and foul air. In stores where food is sold these people have to enter refrigerators where the temperature is twenty or thirty degrees lower than the store temperature. The sudden exposure to such a variable temperature accounts for some of the muscular pains as found in myalgia. The pain in the sacral region can be explained by the fact that the sacrum acts as the keystone of the trunk. The weight of the body being constantly applied to the sacro-iliac ligaments the pressure and tension produce the pain when overstrained. Unless the cause be removed a plaster can only afford slight and temporary relief.

There is also a cardiac group. These patients come to the doctor complaining of heart disease giving the following symptoms: palpitation, pain or an uncomfortable feeling in the sternal area, dizziness, headache and in severe cases a sinking feeling fearing an attack of syncope. On examination no abnormality is found except perhaps a low blood pressure ten to twenty points below normal. The patients are assured that there is nothing wrong with their hearts but that the condition is caused by indigestion. As most of these patients do not improve on a diet with digestive aids, they are put down as neurasthenics. At the end of two or three years some of these patients die suddenly while others develop cardiac irregularity and murmurs. A little thoughtful application of physiology is sufficient to explain the condition. We are aware of the rapid and sudden response of the heart to the various changed moods of the individual. Fear, joy, sorrow, sudden changes in posture and excitement of any kind throw the heart out of rhythmic action and most of the time the number of beats is accelerated. The heart being a muscle why should it not behave like any other muscle? We all know that when muscles are overworked, as by walking long distances they begin to ache without showing pathological changes. Then why should we not assume that when the heart is overworked it also gets tired and begins to ache without showing pathological changes for a while. The argument may be advanced that the heart muscle differs in structure from ordinary striped and unstriped muscles, therefore it ought to behave differently. Granting that it does behave differently and it can stand exertion much longer than the other varieties of muscle; but assuredly it must have a limit of endurance and when that limit is reached it would act like other muscles. If this condition were recognized early, it is fair to assume that many lives would be saved either from a premature death or from chronic invalidism. According to statistics compiled by "The

Metropolitan Life Insurance Co.," the death rate from organic disease of the heart is second only to that from tuberculosis, and while the death rate from tuberculosis is constantly decreasing, that from organic heart disease is increasing. During the decade from 1900 to 1910 the death rate from organic disease of the heart increased from 116 per 100,000 to 161·6 per 100,000, an increase of 39·3 per cent. During the same period the death rate from tuberculosis declined from over 200 per 100,000 to 158 per 100,000. During the same period the death rate from arterial diseases increased from 5·2 per 100,000 to 25·8 per 100,000, an increase of 396·2 per cent. That physical exhaustion is responsible for this higher death rate is proven by the fact that between the twenty year period, from twenty-five to forty-five, during the most active period of the life of the individual, the death rate is very much higher for males than for females in the wage earning element of the population. The average death rate at that period is for males 85·5 per 100,000, while that for females is only 69·1 per 100,000. Similarly when one compares the death rate of the wage earning element with that of the general population, during that twenty year period, it is found that while the approximate average death rate of the general opulation is 55·7 per 100,000, that of the wage earners is approximately 77·4 per 100,000 or 139·1 per cent. as great. During the same decade, from 1900 to 1910, the death rate from Bright's disease rose from 81 per 100,000 to 95·7 per 100,000, an increase of 18·1 per cent. This difference in mortality rate can only be explained by the cumulative effects, upon the vitality of the wage earning element, of more severe conditions of life and work, affecting the male sex more severely. It may safely be said that this increased frequency in the degenerative diseases is a distinct tendency in modern life, and corresponds to the increased industrial activity. These diseases bring about hardships and distress which cannot be shown in figures; for owing to their incidence among adult males they strike heavily at the chief or only income producers in families. Very often families have to struggle through long periods of sickness in which the wage earner has been unable to work even part of the time. Long before any actual cardiac disease is discoverable, signs of physical exhaustion appear. Unless this condition is promptly treated by rest and removing the cause if possible, it becomes pathological. In other words a prepathological cardiac condition ought to be recognized. Such a recognition would prevent a great deal of poverty among the industrial element of our population.

In the gynæcological type of physical exhaustion the patients complain of pain in the back, weakness, irregular menstruation, menorrhagia, leucorrhœa and headache. These cases are generally treated with douches and tonics. When they do not improve and if a gynæcological examination reveals a slight uterine displacement or a slight cervical or perineal laceration an operation is advised. This treatment occasionally brings relief to the patient for a while, due more to the enforced rest than to the operation itself. In most cases the old symptoms return in the course of a few weeks or months. These patients are also relegated to the human junk heap known as neurasthenia, while an analysis of the life led by the average married woman will reveal the causes. She rises at six in the morning to prepare a cup of hot coffee for her husband before he goes to work. She then wakes her children, dresses them, washes and feeds them and send the older children to school. This takes her till about half-past eight, then the younger children or baby require attention, which takes her to about half-past nine. The woman must now run out to make her purchases, for generally she has no telephone or maid and by doing her marketing personally she is often able to save a few cents. When she returns it is half-past ten, she must then start to prepare dinner for the family, which includes a boarder who is generally taken to reduce the rent bill. The woman, having prepared the dinner, starts in the cleaning of the house. After an hour's work she remembers that she has not eaten anything yet. While she is considering what to eat, the cooking dinner requires attention or else one of the children wants something. She forgets her hunger and attends to the dinner and children. At noon she eats the first particle of food so far for the day. But this food is not eaten the way mortal beings should eat, for she is disturbed frequently, during her meal, by attending to the others who have to be served. She manages, however, to race through her dinner and sends her children off to school again and her husband, if he had lunch at home, to work. After cleaning the table and washing the dishes she has to think about washing clothes and scrubbing the floors. By this time the younger children become irritable and get on her nerves, so that when the older children come from school she is only too glad to send them out in the street to play so as to enable her to finish her work. After this she has a double anxiety which increases her nerve tension, namely, the safety of her children in the street and the desire to finish her work in the house. Soon after she has to prepare the supper and when she finishes her supper and cleans up she finds that it is already half-past seven in the evening. She then starts mending or sewing clothes for the children, for there are usually five or six children in the family; consequently economy must be enforced, otherwise there will not be sufficient money to cover the living expense as well as for clothes and medical attendance. By the time that she gets the children to bed it is ten o'clock in the evening. The woman herself now drops off to skeep, but sleep for her is not of the restful kind, for she sleeps in an overcrowded stuffy and poorly ventilated room. All the extra family clothes are kept in the bed rooms.

Often as many as four individuals occupy one small bedroom. During the night a child wakes up crying with a toothache or the baby has an attack of colic or else it has to be nursed. The result is that the woman wakes up in the morning not much rested. This monotonous hard life continues day in and day out without any change, except when the woman gets sick or is confined, then she has a rest for a few days. Is it any wonder that these women complain of backache and menstrual disturbances when the pelvic organs are continually congested, and will a gynæcological operation cure or even improve the condition of such a patient when the disturbance is caused by physical exhaustion.

Similarly a sales girl is on her feet for eight or ten hours a day. A girl in a factory may be sitting in a cramped and ill-adapted posture for the same number of hours while at work. As a result of the continual strain caused by the weight or attitude of the body on the pelvis, the pelvic organs become congested, resulting in menstrual disturbances. For similar reasons menorrhagia is often encountered in very anæmic women. Consequently a curettage would not benefit these cases for the causative agent is not removed by such a procedure.

Treatment. As pointed out above, any form of treatment, the essential element of which is based on rest, brings about a temporary amelioration of the condition. However, surgeons ought to keep their patients under observation for a time, under favourable conditions, before deciding to operate in, chronic and obscure cases, so as to exclude physical exhaustion as a cause. This would reduce the number of surgical failures so evident at the present time. Similarly it is hard to understand how a test meal given a patient, the first time that he enters a doctor's office, will throw any light on the function of the stomach. It must be remembered that the stomach is not a test tube and that so many factors influence the function of the stomach, in civilized man, that one can only expect to arrive at approximate results under the most favourable conditions, which are hardly present when a patient comes to consult a doctor, in his office, for the first time. In order to obtain permanent results and overcome this modern tendency to early physical deterioration, which is worse than the ancient epidemics, in net results, though less spectacular, people must be taught how to live properly. In order to employ prophylactic measures efficiently, the various human activities must be considered in their elementary forms. This can be accomplished by grouping them into the following divisions: *food, rest, labour*, and *amusement*.

Food. Although food is known to be a vital necessity for living organism, yet under ordinary conditions human beings pay very little attention to the quality or quantity of food ingested. Most people expect to get along very well by passing over the morning meal, simply taking a cup of tea or coffee, eating the noon meal indifferently, or else eating a dry lunch prepared the night before, and rushing off the evening meal so as to be in time for a business or social appointment. The human body like a furnace cannot produce sufficient energy without sufficient fuel. The body, unlike a furnace, will utilize reserve energy for a while, but a limit is reached when the reserve is spent, and the whole animal body begins to suffer. The individual loses in weight, gets weak and becomes inefficient. For a while these people may supplement their deficient diet with cod liver oil, but in time even this addition is insufficient to keep them in good health and a breakdown occurs. Medical men are wondering why women cannot nurse their babies at the present time as well as women did formerly. The answer is that a farmer does not expect to draw milk from an overworked and underfed cow, why should a human being be an exception in nature? The women at the present time do not eat enough to be able to provide sufficient energy for themselves and sufficient food for their offspring. In order to maintain good health sufficient time must be devoted to taking food; attention must also be paid to the quality and quantity of food. Some so-called dietetic experts and vendors of special kinds of food emphasize their pet theories by quoting the Biblical passage, "Of every tree of the garden thou mayest freely eat," interpreting it that man was meant to be a vegetarian. But these theorists seem to ignore the fact that this injunction was uttered before the woman was there to tempt the man, and as soon as the man and woman did eat of the fruit of Wisdom, the Lord realized that there was not sufficient variety of food in the garden of Eden to meet the new requirements of the human race. Adam was then ordered out into the world to produce and obtain the additional varieties of food to meet the new conditions of intellectual development in man. One never looks for great mental accomplishments in herbivorous animals like the cow, but one does find a great amount of mental activity in carnivorous animals such as the fox and dog. The herbivorous animals are bulky and have great muscle power while the carnivorous animals are of reduced size but more intelligent. Therefore man having both mental and physical powers developed to a high degree must have a combination of food; he thus becomes an omnivorous animal. Similarly civilized man requires other food than the savage does. While the savage is satisfied with raw or sun baked food, civilized man must have cooked and prepared food. The more civilized man becomes, the more complex becomes his food, both in variety and in the method of preparation, as well as in the manner of serving it, so as to tempt the palate, as Shakespeare said: "The sauce to meat is ceremony —good digestion wait on appetite and health on both." Consequently speaking of food in caloric values is not sufficient to satisfy modern requirements, as Hippocrates long ago said: "An article of food or drink which is slightly worse but more palatable is to be preferred to such as are better but less palatable." While the industrial evolution was very gradual in the last nineteen centuries, it made very rapid progress in the present generation, so that a man accomplishes as much in a day at present as his grand sire accomplished in a week. This increased activity dissipates a greater amount of mental and physical energy, so that though the working hours are shorter and the hygienic surroundings are better, these in themselves are not sufficient to compensate for the increased expenditure of energy in modern times. As a result, physical exhaustion ensues early in life from malnutrition. These people being in the prime of life are unwilling to lag behind, so they seek relief in the use of either stimulants or narcotics. Simply passing laws to prohibit their employment does not prevent them from obtaining these drugs or beverages. To remove the cause for their desire, these individuals must be brought back to a normal state of nutrition by providing them with proper and sufficient food, eaten at proper intervals and under proper conditions.

Rest. The rest period is very important in the life of the individual, but in order to obtain the proper amount of rest it is necessary to have rooms that are well lighted and ventilated and which are not overcrowded with useless furniture and clothes. Rest periods should also be provided during working hours in those occupations in which the worker is required to assume unnatural postures or when individuals are required to be on their feet for prolonged hours.

Labour. Labour is a very important factor in the production of human happiness. But in order to obtain the maximum of efficiency with the least dissipation of energy certain measures must be employed. Industry must not only consider economies in production, but must also consider such economies of human effort as will conserve the health and life of the individual working man. Inasmuch as the large shop or factory, where large numbers of working men congregate, is an outgrowth of modern industrial development; so in order to prevent early physical deterioration of our population, we must have legislative enactment and enforcement of certain improved working conditions, such as hours of labour, sufficiency of light, purity of air and the maintenance of a favourable temperature and humidity in the shop. Machines ought to be employed for the benefit of both employer and employee, so that when a new machine is invented working men will not hesitate to utilize it for fear that it will replace them in their jobs. It is unfair to compare the present hours of labour with those of fifty years ago, for the working conditions are not the same. Formerly the small individual shop was the rule. Thus a tailor worked in his house or in a little shop and he was required to make the whole garment. This enabled him to change his posture at intervals. He worked at the machine for a while in a certain position, then he would change his posture to do some sewing by hand, or would have to stand up to press the garment. This way he would set into motion different groups of muscles, so that while one group of muscles was active other groups were able to rest, and with the frequent changes of posture the body was able to stand the strain of longer hours with less fatigue. With modern large factories division of labour is the rule; thus tailors are divided into operators, who sit and work at machines all day; pressers, who press garments all day; and basters, finishers, etc., who do their little but important shares in the making of the garment. All these workers maintain one postural attitude peculiar to each branch all day long without change. Consequently fatigue easily sets in with the early development of physical exhaustion. What is true of the clothing trade is equally true of the machine shop and industry in general. Any efforts made to prevent or delay this tendency to early physical exhaustion will amply repay employers and the state for the additional expense involved, by increasing the product on the one hand in the extension of the span of life on the other. Workingmen ought to undergo medical examination at the time of entrance into an industry and periodically thereafter. Such periodical medical examination would often reveal physical defects or early organic disease. In such cases the early application of remedial measures would give good results. In cases where the nature of the work would tend to aggravate physical defects a change of occupation ought to be arranged. This would prevent chronic invalidism and poverty.

The overworked housewives, owing to the difficulty in obtaining domestic help have to rely entirely on their own ability to do the house work. It would, however, be of some help if, instead of lecturing to these women on how to bring up their children, the community would re-employ the war nurses, whose duty it would be to collect the children in assigned districts, and take them to a playground where they could be amused for a few hours a day. This would keep the children off the streets and diminish the number of accidents, and at the same time the mothers could have a couple of hours rest in the afternoon.

Amusement. The human race has developed a natural craving for amusement of all kinds, and the higher the degree of civilization the more varied become the forms of recreation and amusement. At present, in large cities, all places of amusement are concentrated into a restricted area to which all pleasure seekers must come. In most cases people have to travel long distances to reach their particular place of entertainment, and by the time they return to their homes it is usually past midnight.

An analysis of modern city life shows that the residential districts are usually situated in suburbs, while the theatres, dance halls and lecture halls are usually situated in the centre of the city. People must be at the theatre or other place of amusement at eight o'clock. After the performance, at half-past ten, an hour or more is spent at some hotel or restaurant partaking of refreshments. Another hour or so is consumed in cars, returning home at about half-past twelve or one o'clock in the morning. As modern city life does not appear to be conducive to friendliness among neighbours, there is a feeling of loneliness in one's own home. In order to overcome this lonely feeling in a big crowd, people spend five or six evenings a week in the city, away from their homes, thus depriving themselves of a proper amount of rest. In time this lack of sufficient rest begins to tell, physically and mentally, and brings about a condition of physical exhaustion, terminating either in tuberculosis or in disease of the circulatory system. The remedy is not to advise people to refrain from amusement, but to alter the methods in vogue. This can be accomplished by utilizing the existing school buildings and grounds in each district for purposes of amusement. There is no valid reason why a school building belonging to the public and maintained in good condition with public money, should be closed most of the time. Instead of being compelled to seek amusement at some distance from home why could not the adult population of a district utilize a heated, well ventilated and a well equipped public building with a large gymnasium such as modern schools are provided with. The school gymnasium could be utilized for gymnastic classes, for exhibiting works of art, for dancing, for amateur theatrical plays, for cinema shows and for lectures. Class rooms when not required for regular work could be utilized for meetings of young people's local clubs, literary and debating societies. This would bring young people together under favourable conditions. Young boys and girls would not be forced to meet on street corners, but would have a regular meeting place constantly guarded by the various moral forces of the community and under the watchful eyes of friends. This would have a tendency to bring the people of the neighbourhood together, neighbours would get acquainted with each other and would also become more sociable. This would remove the necessity for people constantly to seek new forms of excitement in order to overcome the feeling of loneliness so prevalent in large cities. Young people would not be forced to seek recreation in stuffy picture shows and dance halls of doubtful moral character. Such an arrangement would have a tendency to diminish crime and delinquency. This would also have a beneficial effect on people generally. They would not have to rush through their evening meal in order to be in time for their particular form of amusement, for it would eliminate the travelling of very great distances. People could be home sufficiently early to enable them to get an ample amount of sleep and rest. This would be conducive to health and efficiency. We would then see fewer men and women in their prime of life pale-faced, discontented, ill-tempered, ill-nourished and in poor health when they ought to be cheerful, happy, pleasant, agreeable and healthy.

In summarizing I would say that the medical profession ought to take a broader view of public life and health, for the wealth and progress of a community depends on the health of the individual members forming the state.

Beginning with the January issue, the Medical Review of Reviews of New York will inaugurate a new department for the advancement of the science of Chemo-Therapy.

In order to develop the theories as set forth by the various investigators who have thus far entered this field, we invite the co-operation of all physicians, chemists, bacteriologists and pharmacologists who are doing or contemplate doing work along these lines.

It is our purpose to stimulate a more thorough fundamental knowledge of this subject, which, so far, is little known to a great number of practicing physicians.

Believing Chemo-Therapy to be a rich field for the development of products of great therapeutic value, and that we have so far neglected to give it the importance that past researches would warrant, we are placing this department at the disposal of all those who may find an interest in the subject, as an open forum where contributions dealing with this science will be welcomed.

Case Reports

TWO FATAL CASES OF CHRONIC NEPHRITIS

From the Vancouver General Hospital. Presented by Dr. Strong

Case No. 1. Illustrating Prognostic Importance of Functional Kidney Tests.

S. A., admitted June 21st, 1920, male, age thirty-three. Roumanian, unmarried.

Complaints. Failing eyesight—"kidney trouble".

Past History. Always well in the past except for an operation for appendicitis in 1913.

Family History. Negative.

Present Illness. Two and a half months before admission, patient had a "severe cold". Following this, he noticed some palpitation, shortness of breath and cough. Two months before admission, patient began to have difficulty in reading the newspaper. Sight has been getting worse since. Patient has been losing strength rapidly, and, because of his weakness, was forced to stop his work.

Personal Examination. Definite urinous odour to breath. *Heart:* 15 cm. wide in the 5th intercostal space. Aortic second sound is greater than the pulmonary second. Vessels, sclerotic. Blood pressure, 218-130. *Eye grounds:* Intense neuro-retinitis with some small scattered hæmorrhages. Albuminuric retinitis. Temperature, 98·2°; pulse, 75; respiration, 24. *Urine:* 3630 c.c. in 24 hours, S.G. 1012. Albumin present, no casts. *Wassermann test:* Negative. *Phenolsulphonephthalein test:* 5 per cent. *Mosenthal:* Fixation of quantity and specific gravity. Retention of chlorides.

Treatment. Mag. sulph. each morning; milk diet; hot packs; low protein diet; brandy; measures to control vomiting; venesection.

Progress Notes. July 7th: Urinary output fell to 930 c.c. per day, with S.G. of 1006.

July 14th: Patient began to show signs of uræmia, such as nausea, vomiting, change of disposition. He became surly, drowsy, listless and refused medication.

July 16th: Urinary output decreased, 500-700 c.c. in 24 hours with S.G. of 1005. Temperature 95-97°.

July 20th: Patient had severe epistaxis. Blood pressure, 198-114. These hæmorrhages continued until his death on July 23rd.

Autopsy Findings. Diagnosis: Chronic interstitial nephritis, hypertrophy of the left ventricle, œdema of the lungs, chronic peritonitis, pleuritis, (right) and perihepatitis, acute pericarditis, acute endocarditis, atheroma, atrophy of the spleen, slight double hydrothorax, healed operation wound, appendix absent.

Case No. 2. Fatal Chronic Nephritis with Positive Wassermann. Hypertension. Lowered Kidney Function to Phthalein. Hyposthenuria and Multiple Hæmorrhages. Uræmia. Albuminuric Retinitis.

J. M., admitted July 28th, 1920, male, age fifty-five, single, English. Sailor and longshoreman.

Complaints. Breathlessness, pain in back.

Past History. Yellow fever when 14 years old; malaria when 16; gonorrhœa when 18; probable chancre when 43; rheumatism when 49; severe cold in December, 1919, continuous cough since then.

Family History. Negative.

Present Illness. Shortness of breath first noticed April, 1920. This has increased so much that, at the present time, patient is obliged to sit up. During the past two months, he has noticed a swelling of his ankles at night. Has had pains in the præcordium and pain in the lumbar region for three weeks.

Personal examination. Urinous odour to the breath. *Heart:* 17 cm. wide in its greatest diameter, sounds very soft; no murmurs heard. Blood pressure, 180-130. *Eye grounds:* showed choked disc and albuminuric retinitis. Temperature, 98°; pulse, 75; respirations, 20. *Urine:* 300-500 c.c. in 24 hours, with S.G. of 1012, albumen present; some granular casts. *Phenolsulphonephthalein* test, July 30th and August 2nd, less than 1 per cent. *Wassermann:* blood strongly positive. Spinal fluid negative. Blood examination: Hgb. 85 per cent.; R.B.C., 3,984,000; W.B.C. 10,000. Polymorphoneuclears, 89 per cent. *Mosenthal test, July 30th:* patient refused diet on two occasions, but there *was a slight fixation of S.G. and much diminished output* and no chloride retention.

Treatment. Milk diet, force fluids, followed by saline intravenously. No relief. Venesection 420 c.c. of blood removed. Spinal puncture was done. Fluid clear and not under pressure. No relief of symptoms. Systolic B.P. lowered 14 mm. Caffein citrate 1 gr. every 4 hours. No effect. Pilocarpine, 1-12 gr. twice daily. No relief. Biniodide of mercury given; no results.

July 31st: Patient complained of severe headache. Respiration, Cheyne-Stokes, periods of apnea 30-45 sec. Patient nauseated. Vomited frequently. Blood pressure, 190-130.

August 5th: Delirious. Blood pressure, 198-110. Convulsive movement during periods of apnea. Spinal puncture done. August 7th: Condition very poor. Blood pressure 170-120. Some small subcutaneous hæmorrhages on the back of the hands.

August 9th: Hæmorrhages from bowels and numerous subcutaneous hæmorrhages. Spitting blood. died 8.50 p.m.

Autopsy Findings as follows: Diagnosis: Chronic interstitial nephritis, chronic myocarditis, atheroma, chronic endocarditis and epicarditis, chronic pleuritis, peri-splenitis, jaundice, cyst on right kidney (upper pole), hypertrophy of both ventricles, dilation of both ureters, petechial hæmorrhages under mucous membrane of large bowel, hypertrophy of adrenals, broncho pneumonia, œdema of both lungs, fatty liver, passive congestion of spleen.

The pathological specimens were then presented by Dr. R. H. Mullin, and the pathology of nephritis discussed.

Following this, there was a general discussion in which all members took part. The fact was pointed out that, in Case No. 1, the urinary output and the specific gravity dropped just 7 days before any clinical symptons of uræmia appeared.

This drop in the 24 hours amount and in specific gravity, is by some considered an important diagnostic finding—and it was in this case.

The prognostic significance of the phenolsulphonephthalein test was pointed out. It was of especial value in these two cases.

Treatment received most attention during the discussion. The value of various methods of depletion was compared, and it was agreed that in uræmia it was usually necessary to try them all: Venesection, catharsis, diaphoresis and diuresis.

They probably are of value in the order mentioned.

HOSPITAL CLINIC ON SYPHILIS OF THE NERVOUS SYSTEM WITH A CASE OF TABES DORSALIS

From the Vancouver General Hospital. A clinic by Dr. Weeks

SYPHILITIC disease of the nervous system has been divided into two groups, depending on whether the specific organism attacks, (a) The connective tissues, vessels and meninges, or (b) The nerve substance itself.

As one would expect, the lesions of the first group are termed interstitial syphilis,—those of the second being designated as parenchymatous, and being synonymous with parasyphilis.

Parasyphilis is the term Fournier adopted to indicate those late results of syphilis which were considered not to be direct manifestations of the disease, such as are mucous patches and gummata, but indirect results depending in some way upon a devitalization of tissues induced by the action of toxins.

Tabes and general paresis of the insane are the two forms of parenchymatous syphilis to which most attention has been devoted. The pathological work of Mott on this continent has, in later years, strengthened the growing opinion that both of these diseases are definitely syphilitic in nature. The Wassermann test and the discovery of the spirochætes in the tissues of the brain and spinal cord by Noguchi have practically dispelled all remaining doubts. Then the diseases formerly known as parasyphilis, and considered to be indirectly due to syphilis, are really, in a very great majority of cases, directly due the activities of the treponema pallida, and must therefore be viewed as clinical manifestations of the activity of that organism.

The diagnosis of both interstitial and parenchymatous forms of neuro-syphilis is greatly assisted by the Wassermann reaction of blood and cerebro spinal fluid (the latter being the more valuable aid), and the colloidal gold reaction, which gives typical curves in the two outstanding forms of the parenchymatous category.

As the case which will be presented to-night has been placed in the parenchymatous class, we will discuss in more detail, that particular type.

It is often very difficult to obtain evidence of syphilitic infection in a case of suspected tabes dorsalis or general paresis of the insane, yet Wassermann tests of blood and cerebro spinal fluid give a positive result in almost every instance of general paresis of the insane and in a large percentage of cases of tabes.

The first stage of the infection may be entirely unnoticed or have responded so readily to local treatment as to have caused no suspicion as to its nature. Following it, a lengthy period of quiescence is usually noted—a period during which the organisms remain latent. This period extends over an average of about twelve years. When activity recommences, nerve degenerations begin to manifest themselves and the early symptoms of parenchymatous syphilis of the nervous system arise.

The case we wish to present is that of G. D., age fifty-two; single; English; miner by occupation. Admitted August 25th, 1920, complaining of dizziness, staggering gait, numbness of the hands and twinges of sharp pain in the lower extremities. His Wassermann was negative in blood, positive in cerebro-spinal fluid. Cerebro-spinal fluid cell count, 70; lymphocytes predominating. Butyric positive. Fehling's positive.

Personal History. Syphilis twenty years ago; following infection, he took mercury pills for a year. Rheumatism eighteen months ago. This was evidently considered a luetic manifestation for he was given six doses of anti-specific treatment intravenously and some intramuscular mercury. Influenza and bronchitis in January of this year, since when he has been able to work but little, owing to attacks of dizziness, and weakness of the lower extremities.

Family History. Father died of apoplexy, aged sixty. Mother alive and well.

Present Illness. Onset about six weeks prior to admission when he noticed a dizziness which caused him to stagger. Loss of sexual power was noticed two years ago. There has been some interference with the bladder reflex in that there has been "waiting" at times. There has been also some loss of visual acuity; patient has worn glasses for twenty years. There have been, and are still, sharp twinges of pain in the lower extremities which are not neuralgic or arthritic in nature. Some sensory disturbance in left forearm, hand and left side of chest. No visceral crises or girdle pains.

On admission, physical examination of cranial nerves showed:

1. Normal. No anosmia or parosmia.

2. Some blurring of right disc. Left normal.

3, 4, 6. Pupils contracted and irregular. Reaction to accommodation but not to light. Extraocular movements normal. No nystagmus. No ptosis.

5. S and M normal.

8. A.C. is greater than B.C. Weber, negative.

7, 9, 10, 11, 12. Normal.

Sensation. No anæsthesia or analgesia over head, trunk, or upper extremities. Some analgesia in scattered areas below knees. Pain over ensiform cartilage yesterday attributed to paræsthesia. Thermal sense normal. Position, normal. Deep muscle sense markedly lessened. Testicular sense, normal. Tendon sense lessened. Bone sense lessened (tuning fork).

Motion. Muscular power, normal. Tonus lessened especially in legs. Hypotonia.

Reflexes. Superficial. Abdomen lessened. Crem. active. Plantar, flexor, Oppenheim, Gordon negative. Superficial anal lessened. Bulbo cavernous lessened. Deep, upper extremity, left is greater than right. Lower, K.J., absent. A. J. absent.

Co-ordination. Dynamics lessened in lower extremities. Romberg very marked. Cannot walk in straight line with eyes open. Base of equilibrium widened.

Differential Diagnosis. In making a diagnosis of this case several diseases other than tabes dorsalis were taken into account.

Peripheral Neuritis. (Alcoholic or diabetic) ruled out by presence of the Argyll Robertson pupil and there being little if any actual loss of muscular power. *Ataxic Paraplegia.* In our patient we have no spasticity, no increase of knee-jerks as we would expect to find in this condition.

Cerebellar Disease. The knee-jerks are almost always present and the ataxy is not increased by closing the eyes.

Disseminated Sclerosis. Loss of knee-jerks is *very* uncommon and moreover the staccato speech and the intention tremors are usually marked enough to be noted by even the inexperienced observer.

Pain in the back, loss of power of flaccid or spastic types and variability of symptoms would have indicated a necessity for considering spinal syphilis.

Treatment. Two neodiarsenol treatments intravenously—0·06 and 0·09 gms. respectively. We hope for an arrest of the onward march of the disease, which is, we believe, the best prognosis we can give.

IMPORTANT NOTICE FROM DEPARTMENT OF HEALTH

THE Department of Health some weeks ago mailed to all physicians, veterinary surgeons, dentists and druggists in Canada, a form on which to make a declaration as provided under the Act, showing whether they are engaged in the sale or distribution of narcotics.

It is to be noted that all physicians who obtain narcotics in any quantity to adminster directly to their patients, are considered to be engaged in the distribution of these drugs; likewise all dentists and veterinary surgeons who obtain supplies of these drugs for use in connection with their practice, are considered to be engaged in the distribution of narcotics, and it is, therefore, necessary for them to make the declaration as required under the Act as amended at the last session of Parliament.

Very heavy penalties are provided under the Act for neglecting or refusing to furnish the declaration in question: a fine of not less than $200 and costs, and not more than $1,000 and costs, or to a term of imprisonment of one year, or to both fine and imprisonment, being the penalties specified for non-compliance with the regulations.

Any physician, veterinary surgeon, dentist or druggist who may have mislaid the forms sent by the Department, may, upon application to the Department of Health at Ottawa, obtain further copies in order that the necessary declaration may be filed.

As a number of physicians, veterinary surgeons, dentists and druggists have not so far sent in the required declaration, the Department has advised the Editor that unless this declaration is received within a reasonable period, the law will be enforced and penalties levied upon all delinquents.

Editorial

THE LIABILITY OF THE MEDICAL PROFESSION IN THE COMMITMENT OF THE SUPPOSEDLY INSANE

A MEDICO-LEGAL incident of very genuine importance to the medical profession has recently been brought to our notice. Two physicians having individually and independently examined a patient with respect to his insanity, certified in favour of his commitment to an asylum. Shortly thereafter he was released by the authorities of the institution, and the doctors were brought to trial (before the Ontario Supreme Court sitting at Ottawa) charged with conspiracy to deprive the plaintiff of his liberty and compelling his removal to and detention in an Hospital for the Insane. While the result of the investigation proved that the physicians had acted in good faith, that they had made careful and independent examinations and were disinterestedly concerned to do what was right for the patient, the incident brings, nevertheless, to our notice the great responsibility which attaches to these duties on the part of the medical practitioner.

It is obvious that the law, as laid down, provides very reasonably, for the protection of the patient on the one hand, and of the relatives and the public on the other. It recognizes the fact that physicians are at times, obliged to act in emergency, pending more careful examination in hospital, which is not possible prior to certification.

The decision in this case in favour of the physicians seems to have centered more on the question as to whether or not the doctors were acting in good faith and with reasonable care when they decided on the insanity of the patient, and on the fact that their examination was by no means superficial, and was as thorough and exhaustive as the urgency of the case, and the opportunity permitted. It was not held against the physicians that shortly afterwards the patient was released from the hospital, nor was it considered that this release implied a denial of any mental infirmity at the time of commitment; on the contrary, the evidence was conclusive that the plaintiff's actions could reasonably be attributed to mental weakness.

Briefly, the gist of the law takes it for granted that the physician is acting honestly, and that no legal relation exists between the physician and patient under the circumstances. Where doubt exists or where opinion may differ, a qualified medical doctor must be able to act without rendering himself liable for damages in court. The time has long since passed since it was supposed that an opinion on every mental case could possibly be accurate from one or even two cursory examinations. The necesssity for prolonged observation over days or weeks has already been recognized in every large centre in the country, and it is for this reason more than for any other that *psychopathic hospitals* have been established.

The treatment and consideration of mental defectives has been entirely changed in recent years, and has been placed upon a more sure and scientific foundation. It is high time that this country more fully recognizes the need for proper diagnosis, classification, and care of patients suffering from mental disturbances. The appalling and disgraceful conditions under which the insane have been till recently maintained in this country cannot be too strongly emphasized. One need simply refer to the strides already made by the Canadian Association for Mental Hygiene to realize along what lines improvements may be effected. Above all, there is a greater need for more thorough teaching of the subject of mental diseases in our universities, and a greater education of the public as to its significance both in respect of the community at large and State economy in particular.

REMARKS ON SOME GASTRO-INTESTINAL PROBLEMS

IN seeking for a solution of the diagnostic problems taking origin in diseases of the digestive tract the physician has been glad to call to his aid the results of research in the domain of pure science. Morbid Anatomy, by laying bare the end results of the disease process in ulcer and cancer and the infections furnished him with his foundation. To Chemistry he turned later when he looked for news of what was going on while the stomach was busy; later still Physics was commandeered by Cannon and his co-workers to render visible the motions of the viscera by means of the *X*-Ray. We are now reminded by Dr. Goldie's paper in this issue of the way in which embryology throws light upon some obscure matters concerning the nervous control of these organs, while at the last meeting of the British Medical Association Dr. Arthur Hurst of Guy's Hospital lucidly set forth the relation of psychology to some common gastro-intestinal disturbances.

Before even discussing such a subject this deponent would here and now with humility confess that as touching the inner circle of the psycho-analysists, he is an alien and a Philistine, but having made this confession, would then speak only as a mere physician to mere physicians.

Before the surgeons began to go into the abdomen both to administer treatment and to make a diagnosis, it was the custom to call every complaint beneath the pinafore a neurosis which did not show some gross or outstanding cause for its presence. The more or less indiscriminate entrance of the surgeons into the abdomen, whatever harm it may have done in other ways, was of the greatest value in proving that many of the so called neuroses had in fact their local habitations in the appendix, the gall bladder and the pylorus. When later the *x*-ray followed the surgeon and confirmed his views, many of us had the opinion, felt if not expressed, that all indigestion was divided into three parts, and that the greatest of these lay in the right iliac fossa, the second in the gall bladder, while the third, "which stretched toward the north," was the ulcer bearing area of the stomach. Having failed to prove any one of these to be present we either were frankly stumped or called it enteroptosis.

The article of Hurst referred to above covers a group of cases which have not been uncovered by either chemistry or physics or surgery, and while Dubois two decades ago clearly outlined similar groups, Hurst restates them so clearly, and in the light of war experience so convincingly, that one is justified in referring to at least two.

The frequent complaint of flatulence and the belching of gas is not unfamiliar to most of us, but Hurst points out that only in the case of cancer with obstruction is the production of gas in the stomach due to fermentation. In practically all other instances it is due to air swallowing, rendering its victim a first cousin to the equine crib biter or wind sucker. The cause is psychical and the cure is by psychotherapy. Experience has shown the correctness of this view, for, simple explanation of the nature of the trouble, and the demonstration of the impossibility of its causation by gases of fermentation are usually sufficient to bring about a cure.

The dependence of one type of constipation upon a false idea was strongly held by Dubois, and well restated by Hurst. At first by the ignoring of the normal reflex through laziness or false modesty, the idea of inability to empty the rectum becomes implanted in the mind, and a downward career of daily purgation is commenced and continues until enormous doses are required, in spite of the fact that there is no obstruction anywhere in the tract. Hurst formulates the working rule that if at the end of twenty-four hours the greater part of a barium meal has collected in the pelvic colon or rectum or both, dyschezia or inefficient defæcation of psychical origin may be diagnosed. The remedy lies in convincing the victim of the nature of the trouble, and in patient re-education of the rectum, if necessary by graduated enemata.

It may be of service to emphasize a distinction between on the one hand a "Neurosis" which implies an hypothetical weakness of fibre due to any number of hypothetical causes, and on the other hand a mental condition in which under the influence of a false idea, healthy organs become slackers or incorrigibles in the physical community. The latter is the conception which best explains many otherwise inexplicable disorders. In referring to the intestinal hypochondriac one may be allowed to quote the words of Dr. Hurst. "He alone is happy and devoid of that most trying of the nervous disorders of the bowel, who follows Sir James Goodhart's admirable advice, to do as the dogs do and never look behind him."

ON THE USE OF LOCAL ANÆSTHESIA IN OPERATIONS ON THE UPPER AIR PASSAGES

THE report of the Committee appointed by the section on Laryngology and Rhinology of the *American Medical Association* to study and report on the use of local anæsthesia in nose and throat work is before us and contains many facts of interest to the profession in Canada. In answer to a circular sent out by this Committee to every fellow member of this section, letters were received from about 100 members. In these communications details were reported of numerous cases in which, after the injection of the local anæsthetic, toxic symptoms had suddenly developed, but fortunately had not ended fatally. Details of twenty cases ending suddenly in death were given which had not previously been reported. A review of the fatal cases shows that fourteen of them occurred within a few minutes after the injection of a solution of cocain and adrenalin. No evidence was stated to be at hand to indicate that the adrenalin in these cases was a causal factor, although deaths have been recorded following rapid injection of adrenalin in 1:1000 solution. Of the fourteen deaths due to cocain, five are stated to be due to accidental errors in preparing a too strong solution. The remaining nine, however, were evidently due to cocain injected into tonsillar, peritonsillar or submucous tissues in solutions not exceeding two per cent., in many cases only one-half per cent. As the report says we can conceive of nothing more distressing than a death occurring when least expected, within two or three minutes after the injection of the local anæsthetic to relieve the pain of an operation not immediately necessary to life, but one to which the patient submits at the surgeon's advice. According to the report almost all American operators prefer local to general anæsthesia for operations within the nostrils. In throat operations the unanimity is not so great; a small minority choose general anæsthesia, as they consider it permits greater rapidity in work, and more ease and comfort to the operator. Among the several conclusions arrived at by the Committee the following are in our opinion the most important. The patient should always be recumbent except in sinus operations when an elevation of 45° is allowable. In endo-nasal operations epinephrin should be applied first, and should be followed after a few minutes by a solution of cocain, for this drug still remains the most effectual of local anæsthetics. A synthetic drug may after this be injected into the tissues, but this injection must be made slowly. When any suspicion of danger exists, such as in cardiac disease or Graves disease, one fourth of the total amount of anæsthetic to be used at the operation should be first employed, and the patient watched for a few minutes, before using the remainder. They also recommend that each operation should be preceded by a hypodermic injection of morphine and atropine, and the patient kept, after the operatime in the hospital. It is thought injection of morphine in the adult les the danger of the local anæsthetic and relieves the feeling of apprehension or excitement, which may be an added danger. The use of quinine and urea hydrochloride as a local anæsthetic in nose and throat operations appears to have fallen into desuetude owing to its liability to produce œdema and sloughing.

This report, which should be read in its entirety by all laryngologists and rhinologists, is of great practical interest to the whole profession. In our Canadian hospitals, however, while local anæsthesia is regarded as most suitable in endo-nasal operations, in throat work and especially for tonsil enucleation, the preference is for general anæsthesia as placing less strain both on the patient and on the operator.

Intra-tracheal anæsthesia, however, marks a distinct advance in this field of surgery. Once the tube is inserted in the trachea and full anæsthesia induced, the operator can proceed as freely as if the operation were in another part of the body. There is no gagging and the anæsthetic can be accurately and evenly administered. By this method there is no danger of aspiration pneumonia or pulmonary abscess, which, as everyone knows, is of vital importance. After the operation is over, air or oxygen can be readily given through the tube, greatly alleviating the usual distressing effects of the anæsthetic.

Writing on the subject of fatalities from local anæsthetics the *Journal of the American Medical Association* writes as follows: "The occurrence of twenty deaths in the personal experience of 100 operators shows that the subject deserves earnest attention. Real progress, however, can only be made if cases are reported promptly and with attention to the factors that are in question. As an illustration of the immediate practical benefit that could follow this inquiry, it is worthy of note that a fourth of the deaths reported to this section arose from mistakes in the strength of the solutions. Such fatally-ending mistakes may perhaps be avoided by preparing the cocain solution only as needed, from tablets coloured with a distinctive dye, so that the tint of the solution at once would call attention to the drug and its concentration. Physicians are urged to coöperate also by reporting cases of idiosyncrasy, to the end that further study may result in definitely establishing the causes of sudden death, and that a better understanding may be attained as to the proper technic and proper choice of local anæsthetics for each particular class of cases."

REHABILITATIVE WORK CARRIED ON BY THE ROCKEFELLER FOUNDATION IN CONNECTION WITH THE MEDICAL SCHOOLS IN CENTRAL EUROPE

TO assist Medical Schools in Central Europe, the Rockefeller Foundation announces a co-operative programme covering the following points: Aid in the rehabilitation of scientific equipment for medical teaching and research: Aid in furnishing medical journals to universities throughout Europe: An invitation to the authorities of Belgrade University Medical School to study medical education in America and England, as guests of the Foundation.

Colonel F. F. Russell, who has been in Prague since August serving as technical adviser in public health laboratory organization to the Czech Ministry of Hygiene, will arrange the details of the Foundation's co-operation with the medical schools. These activities of the Rockefeller Foundation in Central Europe are the result of investigations made there recently by representatives of the Foundation. The following extract from a report submitted to the Foundation by one of its officers sent to Europe to make a special inquiry into their needs, gives some idea of conditions in Central Europe with respect to medical education. Decisions of far-reaching significance in the matter of medical school support, the training of nurses, the care of the sick and the prevention of disease must be made in these countries within the next few years. Expert guidance and some assistance in starting sound programmes now may mean much for generations to come. Medical schools of high rank and of long standing exist in the following cities of Central Europe: Vienna, Gratz, Budapest, Prague, Cracow. Other schools of importance are at Warsaw and Lemberg in Poland, at Innsbruck in Austria, at Zagreb (or Agram) in the Croatian state of Jugo-Slavia. This comparatively small number of medical schools serves a total population of approximately seventy-five million people. With the single exception of Austria, all the countries of the region under consideration suffer from a great shortage of physicians. There are reported to be less than 300 doctors in all Serbia. Outside of the Army Medical forces, less than 2,000 physicians are available to care for the twenty-five million inhabitants of Poland. Additional schools are needed adequately to serve these countries, particularly those of the south and east. There is a five year interruption of medical training in Europe which will affect the supply of physician savailable during the coming generation. The instruction of adequate numbers of physicians for the years immediately ahead is essential.

In all the universities of Central Europe the equipment (glassware, rubber, chemicals, and apparatus usually replenished year by year) has been very largely used up during the four years of the war and the two years of disorganized conditions and low exchange which have followed the armistice. The situation in Germany is somewhat different and that country is adequately supplied with medical schools and much scientific apparatus is manufactured in Germany. The greatest desire for American and British Medical Journals was expressed at every university visited. The journals are supplied on an arrangement whereby the university concerned pays in its national currency at the pre-war rates of exchange, the Foundation making up the difference due to loss in exchange. The Secretary arranged personally for the supply of journals to the following universities: Vienna, Budapest, Zagreb, Prague, Cracow, Lemberg, Warsaw. It is proposed to extend the services to Gratz, Innsbruck, and Bucharest, in Central Europe, and to some thirty of the principal centres in France, Belgium, Italy, and Germany. With the idea that Belgrade is one of the strategic points in a world programme in which a medical school must be established in the near future, it has been decided to invite a group of four (4) of the men responsible for its development to make a visit to America for study and inspection. It has also been decided that further assistance will be given by lending a technical adviser in the organization of medical education and that the Belgrade officials will be authorized to recommend to the Foundation from time to time as candidates for fellowships in specialized postgraduate medical study, persons who may be under appointment or consideration for the faculty of the proposed school in Belgrade.

Retrospect

RECENT STUDIES IN PROBLEMS CONNECTED WITH LACTATION AND INFANT FEEDING

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DURING the last few years much attention has been given by pediatrists to the problem of prolonging the lactation period, and of increasing the amount of breast milk available for the infant. As the result of this work they are discarding many of the older theories and practices. With proper care, it is found that the supply for the baby can be made much more abundant.

One of the frequent reasons given by a mother for having weaned her baby is that the milk was "no good". Further questioning reveals the fact that the baby was not gaining, and that it seemed uncomfortable, cried frequently, and sometimes vomited. Owing to these symptoms it was presumed that the milk was poor in quality, and the child was weaned on the advice of a physician, nurse, or friend. Sedgwick claims that it is rare in practice to be able to blame the quality of the breast milk. He discourages the frequent testing of samples which do not represent the milk of the complete feeding. Talbot has shown that a sample to be of any value must be a mixture of the first and last milk, or better still a sample from all the milk it is possible to express. He has shown that the first and last milk may vary as much as ten per cent. as regards the fat content. The appearance of the milk is worthless as a criterion of its quality. Frequently the most watery looking milk contains an excess of solids, while an apparently rich milk may barely be within the normal lower limit.

In cases in which the milk appears to be poor or defective the blame should be put where it usually belongs: either on the quantity of the mother's milk or on the baby itself. The only satisfactory way of determining whether the child is getting enough is to carefully weigh it before and after nursing. This must be done several times at different periods of the day, as the quantity taken may vary considerably. This procedure will generally reveal where the error lies. If the baby be strong, and yet the quantity of milk taken be small, the fault is generally in the quantity of the mother's milk. If on the other hand the child has defective nursing power owing to a hare-lip or because it is premature, excessively weak, or acutely ill, it may mean that the infant is unable by itself to get enough milk for its proper nourishment. Such children are unable to adequately stimulate the breasts so the milk gradually dries up: hence the very babies that need the mother's milk most are deprived of it unless we come to their assistance. If this be done by administering a supplemental feeding in a bottle and neglecting to stimulate the breasts, the latter soon fail and we are left with a baby usually impossible to raise on a bottle. Mothers frequently seek advice under the impression that their milk does not agree with the baby. Sometimes a child is getting too much milk and vomits the excess. It is well to bear in mind that all children's digestions are not normal, and if a child is gaining regularly in weight we can afford to overlook mild symptoms of distress or stools that are slightly abnormal. These children are on a better formula than any we can devise for them and soon adapt themselves to their surroundings.

Some infants exhibit an intolerance for fats as shown by vomiting, distress, colic, and either constipation or diarrhœa. In most of these cases the mother is robust and probably overeating and under-exercising. Correcting the mother's diet and mode of living frequently is all that is necessary. It should be borne in mind that the last milk in the breast is the richest and by materially shortening the time of nursing the symptoms tend to correct themselves. If this plan is adopted, the mother should be taught to express the milk remaining in the breast after nursing, as failure to properly empty the breasts is one of the most frequent causes of a diminishing supply.

The anæmic, undernourished, nervous mother seeks advice because her baby does not gain, shows a tendency to vomit, and to have colic and putrefactive stools. The proteid of the milk has been blamed in these cases and the many contributing causes ignored. That the child is not digesting the proteids is evident, but careful examination of the milk does not disclose an amount of proteid above what a normal child can digest. Many of these children have an unstable nervous system which is intensified by the neurotic mother. The child and the mother react on each other with the result that the mother secretes an irregular supply of milk which upsets the digestion of the infant. These cases require study on the physician's part. Frequently every detail of their lives has to be gone into before the underlying cause can be discovered and removed. If the physician does not dominate the situation the ever present neighbour, who has seen similar cases do well on a bottle, will prevail, and weaning will be instituted. This is the commonest type for which advice is asked and these are cases in which mothers are frequently recommended to wean their infants. This plan seldom succeeds. On the contrary they should be referred to physicians who will take the trouble to prolong and improve the lactation period. These nervous women must be kept from worry and excitement and taught to live rational lives.

Four methods of increasing breast milk have been used: drugs, diet, massage and expression. Numbers of drugs have been used for the purpose, but each in turn has been discarded. The latest substances employed as galactogogues have been glandular extracts, but the results obtained have not been encouraging. Morse and Talbot sum up the evidence of any galactagogue action thus far obtained by saying, "There are no drugs, which, whether taken internally or applied externally, can increase the flow of milk to an appreciable extent."

The best diet for a nursing mother has been a very much discussed point. The mother has to have an additional seven to eight hundred calories to make up for those lost in the milk. She also requires an extra fifteen to thirty ounces of fluid. Hoobler, in a series of careful experiments, found that a woman does best on twenty-six to twenty-nine hundred calories. He found that either animal or nut protein was essential. To protect the maternal tissue the nutritive ratio of proteids to carbohydrates and fats should be at least one to six. He found milk protein the best one to produce milk and conserve the maternal tissues.

McCollum demonstrated in rats that the mammary gland can pick out the necessary amino-acids, the fat soluble A. and the water soluble B. vitamins from the blood, but considers that it has no synthetic power.

Most authorities agree that a generous mixed diet is essential. Depriving a woman of things she likes, if they are nutritous and digestible, is no longer deemed desirable. Provided her digestion is in good order there is no single thing forbidden. It is also no longer considered essential to consume large quantities of milk, soups, and gruels. In fact a large quantity of these fluids may do more harm than good.

The following is the diet Abt employs for his wet nurses. These women are nourishing their own baby and supplying an average of thirty-seven ounces per day for the hospital. 8 a.m., cereal, fruit, milk, rolls, cocoa or tea, eggs. 12 noon, soup, meat, potato and one green vegetable, cereal, pudding or ice cream and occasionally cookies. 6 p.m., meat, vegetables, cereal, stewed fruit and tea or milk.

Massage and electricity have been also tried. Both may have a psychotherapeutic effect. E. Truby King, of London, has been the most ardent advocate of this method of stimulation but recent reports indicate that he is adopting expression of the milk from the breast as a more satisfactory method. On this continent massage of the breast is not favoured and is generally condemned.

Sedgwick has elaborated a method of expressing the milk from the breasts which he has found satisfactory both for stimulating production and also for reinstating breast feeding. The breast is grasped one or two cm. back of the coloured areola and a milking motion is carried out toward the nipples. He has the baby nurse every four hours and follows the nursing by a milking of the breasts by hand. Any milk secured in this way is given to the infant in a bottle. If sufficient nourishment has not then been given a small supplemental feeding is supplied. He considers the substitution of a bottle feeding for a nursing a pernicious measure, because the breast is deprived of the stimulation so much needed in these cases where the supply is failing. He cites a case in which he brought back an abundance of milk after a child had been weaned for nine weeks owing to the serious illness of the mother.

The only absolute contraindication for nursing is tuberculosis in the mother. Should she have a severe illness or be suffering from some chronic wasting disease it may be considered unwise to attempt to nurse. Menstruation is not considered to have any permanent deleterious effect on the milk.

The prenatal preparation of the woman for nursing is not taken up as this important work belongs to the obstetrician. Closer co-operation between the latter and the pediatrist is essential.

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Men and Books

> *"For books are not absolutely dead things, but do contain a potency of life in them, to be as active as that soul was whose progeny they are; nay, they do preserve as in a vial the purest efficacy and extraction of that living intellect that made them."*
>
> JOHN MILTON—Areopagitica.

I

THIS section of the Journal was inaugurated by William Osler in January, 1912. It was literally his own department, containing articles by himself only, upon subjects culled from those quaint by-paths of medical biography in which he loved to wander, or upon current events of interest in the history of Medicine. For the time being it formed his whole contribution to Canadian Medicine and it came as his message to us here until sterner duties connected with the War necessitated its abandonment.

The quotation cited above was used by him to introduce his address "Books and Men" on the occasion of the opening of the Boston Medical Library in 1901. The spirit of a book is indeed that of the man who made it and it was out of his intense love for humanity that Osler himself loved books so well. In the revival of this department at the present time, his spirit is invoked to guide it, so that the ideals of work and service that live in his pages may be furthered here.

The following titles taken at random from some of the Journal files, show the trend of these delightful little communications from him, which might have been described as an overflow from his rich experience in the favorite avocation of his life: Dr. Slop; John Shaw Billings; Aristotle; Gomperz' Greek Thinkers, Volume 4; Robert Fletcher; The Young Lænnec; Mediæval Medicine; William Beaumont; The Works of John Caius, M.D.; Gui Patin; George Bodington; Histoire de la Charité; The Funeral of Lord Lister, etc.

The following account of a meeting recently held under the auspices of the Montreal Medico-Chirurgical Society at which papers were read on the early life of Sir William Osler, is presented here with the thought that it may serve as a fitting introduction to what we venture to hope may again become a live department.

The proceedings were opened by the President, Dr. W. W. Chipman, in the following words:

"We are to devote this evening to the memory of the late Sir William Osler, to a study of his earlier life and work. We are indeed fortunate in that this study is to be presented to us by his nephew, Dr. Norman Gwyn, and by his old friend and associate, Dr. Francis J. Shepherd. For the one, himself a distinguished physician, enjoys the bond of a close kinship, while the other, known the world over as an Anatomist and Surgeon, was perhaps his most intimate friend.

It is wise to recall to ourselves the lives of our distinguished men, for so only can we profit from their example and gain wisdom and inspiration from their experience. A prophet should be always a prophet *first* in his own country. And so much the worse for his own country if he is not. Sir William Osler was truly one of ourselves. The earlier years of his busy working life he spent in this community; and through all the after distinguished years, he never forgot us. During his sojourn here he was an active Member of this Society, and many of his first contributions to the Science and Art of Medicine were made to it. He has been, perhaps, the most illustrious member of the Montreal Medico-Chirurgical Society.

We meet to-night within the precincts of his old university. The walls are new, but it is his old school. In the adjoining museum are to be found many of his earlier pathological specimens, while the library has been already enriched by his numerous gifts. As you know, his complete library is bequeathed as a special legacy to us, and in due time his ashes are to repose here.

It is well that we, as a society, should devote this time to the recollection and the study of the life and work of this great man. For us he will always be the greater, inasmuch as he was throughout his life one of ourselves."

Dr. Norman B. Gwyn, of Toronto, opened an illustrated address on Sir William Osler's early life by expressing his feeling, which was an emotion deeper than pleasure, in addressing the society on this subject within the school that graduated Osler, which must always be in this relation to the student of medicine holy ground. A feeling of reverence should not, however, overcast the proper outlining of a very human character, one like that of most other normal men in their youth, save in the possession of an unusual charm, and in having an initiation and foresight uncommonly developed. He divided his subject into four parts:

1. *Heredity and training.* A survey of the influences bearing upon the development of the man showed in the first place a remarkable inheritance evidenced in the preceding generation by a turning

away from the ancestral calling of commerce and shipping to scientific and literary activities of a really high order. This bent was especially marked in his father, the Reverend Featherston Osler, a truly extraordinary man, who, at the age of twenty-five, after thirteen years in the Royal Navy, commenced the study of Theology, and after nearly seven years spent at Cambridge in getting an M.A. and reaching a deacon's status, forsook the hope of a comfortable English living for pioneer missionary work in Canada, and came with his young wife to that part of Ontario situated on the old Penetang Road, which was the seat of active colonial extension at that time. The family was well established and the early hardships over when, thirteen years after their arrival in Canada, Sir William was born, at the old Bondhead Parsonage, on July 12th, 1849. In his ninth year the father, Featherston Osler, was removed (at his own request and for the education of his sons) to Dundas, where he remained stationed for the remainder of his life. Here the boys came under the eye and hand of King, head of the justly celebrated Dundas Grammar School, and a settled social existence superseded the rougher Bondhead life; the Rectory became now the typical quiet English home, "a gardener's pride", and the conditions of home duties in a large family circle, and hearty boyish activities and the acquirement of numerous friendships and interests, filled seven singularly happy years, passed too under the close home-training and judicious discipline tempered with affection of a remarkable mother, whose influence remained paramount throughout his life.

2. *The man and the opportunity.* An amazing chance brought Osler as a schoolboy into close personal contact with a group of naturalists, and especially with one man among them who may justly be considered among the chief compelling influences of his life. At the age of sixteen he was sent to Trinity College School, where, waiting to receive and lead him, was Johnson, "priest of the parish of Weston", "a man of the White of Selborne type" who knew Nature intimately and knew too, how to interest his boys in her. Closely in touch too with the school, possibly Johnson's teacher in Natural Science, and certainly his co-worker in this field, was another oncoming influence, James Bovell. The quiet development of Osler's interest in Natural History and Zoology, an interest gradually increasing to enthusiasm under the free use of the microscope and the active guidance and co-operation of his seniors, was the deep underlying feature of the Weston life.

3. *Adolescence.* In the fall of 1867, Osler left Weston for Trinity University, entering as a student in the academic department preparatory to taking up the studies in divinity towards which his intimacy with Johnson had evidently directed him. Of his progress in Theology at the University we know nothing, but the effect of this specialized directly classical teaching is seen in all his writings. Bovell was the professor of Physiology and Chemistry, and the giver of lectures on "Physiology in its relation to Natural Theology". Osler's subsequent transition to medical studies was merely a move into another realm where his master reigned supreme, and in 1868 he entered the Toronto school of Medicine and began those fifty-two years of uninterrupted productive activities which have so materially influenced the Medicine of the world. In 1870 Bovell was gone, and the influence that to Osler had been the leading kindly light for years was no longer there to be looked to, and so the temptation towards the then better hospital facilities in Montreal met with no resistance.

4. *An idea and its cultivation.* Osler owed much of his progress and development to the cultivation, from his earliest days of an idea that was revolutionary, in the sense that it was original with himself, in regard to the method of approaching one's life work: the Conservation of Time; this idea produced, through his teaching and example, the modern system of developing medical teachers and consultants. It may actually be called *The Osler System.*

A note-book of Dr. Johnson's, in which was recorded the receipt of specimens for microscopic study from Osler while yet a schoolboy, was exhibited.

Dr. F. J. Shepherd then spoke upon Osler's Montreal period from his graduation in 1872 to his departure for Philadelphia in 1884. A tribute was paid to the late Sir William Dawson, the then principal, who had "built up the university from a very small affair"; to Dr. G. W. Campbell, then Dean of the Faculty, and a man of strong personality and great surgical reputation; and to Dr. R. Palmer Howard—accounted the third great influence in Osler's life,—whom he described as an earnest, enthusiastic, highly competent clinical teacher with a deep interest in pathological anatomy and a wide knowledge of contemporary literature, who quickly recognized Osler's capacity and moved everything to give him the opportunities and equipment he required.

Coming to the subject of Dr. Osler himself, during these years, Dr. Shepherd dwelt with affection upon his personal charm, which endeared him to all his Associates, and his inextinguishable sense of fun; his power as an observer and his rank as a great clinical teacher, whose contribution to Medicine was the introduction of bedside teaching on this continent; his remarkable literary productivity and the stimulus and inspiration he brought to the Medical Societies and Journalism of the time, especially also to the men younger than himself by whom he was even then surrounded.—"When he left us, the light seemed to have suddenly gone out."

Dr. Lawrence J. Rhea, then spoke as follows:

"We have been very much interested in all Dr. Gwyn has told us about the early life of Sir William

Osler, which might be referred to as his first formative period. A period, which under the influence of such an excellent teacher, and broad-minded man as Dr. Johnson, might have formed the basis for a life devoted either to the arts of the sciences. Fortunately for us, in the case of Sir William, both the arts and the sciences were keenly appreciated and understood.

His career is of interest to any one who takes life seriously, but especially to Pathologists, first because Pathology did a great deal for Sir William, and next because Sir William did a great deal for Pathology. He, more than any man that I have known, had the ability to look beyond the gross and even the detail of pathological lesions, and apply them to the living. Thus, however great his interest was in disease—as, for instance, in one of his pet diseases, aortic aneurism—however much he understood and appreciated the basic lesion that led to the gradual dilatation of the aorta, the formation of the laminated clot and the anatomical changes that might take place in this condition, he saw far beyond these; they meant to him also a brassy cough, a tracheal tug, a contracted pupil, and the excruciating pain to the patient that is associated with erosion of the vertebræ. His interest was in unfortunate and suffering humanity, and he used Pathology as well as all the other branches of medicine in the interpretation of clinical signs and symptoms, the prognosis and treatment of disease. The memory of Sir William will always be very dear to us, because he was a personal friend to many of us, a teacher of us all, and he upheld real ideals in life."

An exhibition of the large Osler Pathological Collection, consisting of some one hundred and fifty specimens placed in the Museum of the Medical Faculty by Dr. Osler himself during his term as Pathologist to the Montreal General Hospital from 1877 to 1884, and which were of great interest as having nearly all been made by him, and a historical exhibit of rare first editions, diplomas, etc., presented by him during his life time to the McGill Medical Library, were demonstrated at the close of the meeting by Drs. Maude E. Abbott and C. F. Wylde.

M. E. A.
H. P. W.

Obituary

DR. JOHN PHELAN MACDONALD

John Phelan MacDonald died suddenly at the S. C. R. Hospital, Edmonton. His death was due to pulmonary embolism arising from phlebitis following an operation on his foot. Dr. MacDonald graduated from McGill University in 1905 and afterwards studied in Edinburgh and Glasgow, and took some special post-graduate work in Harvard. He took up practice in Edmonton in 1909, where he was very successful. In November, 1915, he enlisted for War service and went overseas, where he became attached to the R.A.M.C. and served in the 58th Scottish General Hospital, and afterwards at the front with the 55th Lancashire Regiment. After the Armistice he remained six months serving with the army of occupation in Germany. His faithful and self-sacrificing devotion to duty appeared to have lowered his vitality and indirectly led to his death.

DR. JOHN CALVIN LITTLE

Dr. John Calvin Little, of Killarney, died suddenly of heart failure while on a visit at the Royal Alexandria Hotel in Winnipeg. He came west to Manitoba in 1903, and after becoming a member of the College of Physicians and Surgeons of that province, he took up practice in Alexander for a few years, but afterwards moved to Killarney, where his brilliant personality won for him many personal friends, and an enviable practice. His sudden death is deeply regretted by all who knew him.

Abstracts from Current Literature

SURGERY

Observations on Empyema. Ashurst, A. P. C.: *Annals of Surgery*, 1920, Vol. LXXII, p. 12.

Ashurst tabulates the opinions expressed by his father twenty-six years ago regarding the indications for and the methods of operating upon empyema. He believes that for the most part, the advice offered at that time still holds good. His conclusions summarized are as follows: If massive purulent effusion is present most of the fluid should be removed by aspiration one or two days before thoracotomy is undertaken. Thoracotomy may usually be postponed in cases of seropurulent effusion until frank pus is obtained. Exploratory thoracotomy should be undertaken if pus is suspected and the symptoms urgent even though no pus can be found by needle. Thoracotomy for empyema should be performed under local anæsthesia and should provide free and dependent drainage by the resection of a rib. Post-operative irrigations are usually unnecessary. If healing does not take place after several months, Dakin's solution or Beck's paste may effect closure. If not, major operative interference, decortication, or decortication plus collapse of chest may be necessary. The average period among the author's patients before closure took place was seven weeks. F. B. Gurd.

Empyema—A Syllabus of Operative Treatment. Lilienthal, H.: *Annals of Surgery*, 1920, Vol. LXXI, p. 87.

Lilienthal believes that when empyema cavities are single and simple, they should be treated by ordinary drainage, with subsequent disinfection by Dakin's solution. The more complicated cases require exploration with simplification of the cavity and mobilization of the lung. Chronic empyema with sinus demands non-collapsing thoracoplasty. F. B. G.

Operation for Empyema in Young Adults. Bunts, F. E.: *Annals of Surgery*, July, 1920, Vol. LXXII, p. 66.

Bunts considers the *x*-ray more useful than the needle in localizing an empyema. With bacteria present in the effusion but no pus, a two per cent. solution of formalin in glycerine is injected after aspiration. Seven out of sixteen cases were cured.

With both bacteria and pus present, operation is performed within twenty-four hours unless pneumonia be present. General anæsthesia is the rule. Rib resection is performed, a tube sutured tightly in position and clamped. The clamp is opened at half hourly intervals until the chest is evacuated. After ten days the chest is washed out twice daily. Blowing bottles and exercises are employed, with fresh air and forced feeding. F. B. G.

The Treatment of Chronic Empyema. Tuffier, T.: *Annals of Surgery*, September, 1920, Vol. LXXII, p. 266.

In the treatment of acute empyemata, Tuffier employs the Depage-Tuffier method. This consists of discontinuous irrigations by Dakin's solution through carefully placed Carrel tubes in all corners of the cavity. If a broncho-pleural fistula exists, oxygen is substituted for Dakin's solution. When the culture curve reaches zero and a dry compress placed over the opening remains dry for twenty-four hours, surgical closure is brought about. By this method an aseptic pneumothorax is formed.

Four of the acute cases became chronic, the cause being either pleural diverticula or bronchial fistula. Whatever the cause of chronicity it requires a long and difficult treatment.

The operation of Estlander is ill-advised. "Our object is precisely the contrary." It consists in every case where possible in removing the pleural shell to permit the lung to return to its proper position in the thoracic cage. Treatment is preceded by careful radiologic and bacteriologic examination, and the use of the pleuroscope.

Disinfection is attempted; if found impossible decortication complete or partial is undertaken. Tuffier states that costal resection should be reduced to a minimum. Closure of the surgical incision and pleural decortication should be preceded by disinfection of the cavity and they then give success which was formerly unknown.

This article is well illustrated and includes a statistical table of cases. F. B. G.

The Treatment of Chronic Empyema. Hedblom, C. A.: *Annals of Surgery*, September, 1920, Vol. LXXII, p. 288.

Hedblom's article is of greatest interest on account of the completeness of its bibliography (one hundred and sixty-three references) and the historical review of methods of treating thoracic empyema from the time of Hippocrates who taught that the pus should be evacuated by either cautery or knife. Estlander in 1879 recommended the removal of a sufficient number of ribs to completely unroof the cavity in cases that were chronic. Schede in 1890 described the extensive resection that bears his name. In 1892 Delorme enunciated a new principle in the treatment of chronic empyema cavities; namely, that of their obliteration by re-expansion of the lungs. About the same time, 1893, Fowler employed this method. To the former belongs the credit of having first enunciated the principle and to Fowler of having first performed the operation. Since this time the method of rib-spreading designed to conserve the chest wall has been developed. The plastic methods of Robinson and Beck have been useful in certain cases. In Hedblom's opinion a major procedure is indicated only when non-operative or less extensive surgical treatment may reasonably be considered less effective. In case of sinuses and small cavities, adequate drainage is usually sufficient to effect a cure with or without a short preliminary hypochlorite treatment. Dakin's hypochlorite solution is the method of choice in the treatment of the ordinary type of chronic cavity. A pulmonary decortication, through a rib-spreading exposure after a preliminary hypochlorite solution irrigation, is the most conservative treatment for cavities that are not obliterated by drainage or by treatment with Dakin's solution. If the lung does not expand, a plastic operation is indicated. If the patient is debilitated this should be done in two or three stages. A tuberculous empyema not secondarily infected should not be drained. Operative closure of bronchial fistulæ that persist is necessary to complete healing. This may be accomplished by decortication of the involved portion of the lung, with cautery, suture or skin plastic operation.

F. B. G.

Suture of the Patella. Desfosses, P.: *La Presse Médicale*, November 13th, 1920.

The author in discussing poor results following operations for fracture of the patella emphasizes the fact that the highest success is obtained, not by hit-or-miss methods of fixation of the fragments, but by a most careful and accurate co-aptation of the bony surfaces torn apart by the trauma, without allowing any shreds of fibrous tissue or a dead space to intervene. He emphasizes too, the importance of forcing together the fragments by strong forceps preparatory to the fixation. While apparently preferring catgut, he regards the choice of suture material as of secondary importance. Surgery of bone, he concludes, is a surgery of precision, which suffers from the "almost", and is not for the surgeon who is always pressed for time.

F. J. Tees.

Surgical Treatment of Simple Fracture of the Olecranon by Suture of the Aponeurosis. Chalier, A. and Vergnory, M.: *Lyon Chirurgical*, May-June, 1920, Vol. XVII.

The authors report in detail three excellent results obtained in simple fracture of the olecranon by suture of the aponeurosis on the analogy of fractures of the patella sutured in a manner corresponding. They advocate this procedure with two reservations—firstly, in fractures of the tip of the olecranon, where the main triceps insertion is not disturbed, cases which respond to simpler methods; and secondly, transverse fractures with wide displacement in very muscular subjects, where a method of bone fixation is indicated. A posterior longitudinal incision is made, clots are removed from the joint cavity, fibrous tags interposed between the fragments are excised, and with the elbow in full extension the fascial sheaths are sutured with catgut as conditions permit. The elbow is fixed in extension for a fortnight after which passive and active movements are undertaken.

F. J. T.

Reduction of Old Dislocation of the Hip by Open Incision. Buchanan, J. J.: *Surg. Gyn. and Obstet.*, November, 1920.

Case report of hip dislocation (dorsal) of seven months standing in a young man of nineteen, due to severe trauma. Fracture of pelvis and of femur had also resulted from the accident.

Treatment. Preliminary traction by Buck's extension to thigh only, by which half an inch in length of leg was gained. Kocher incision used, acetabulum found filled with dense connective tissue and shreds of capsule. After freeing the head, reduction was effected by manipulation and by the use of levers used on the head as a shoe-horn. Considerable shock ensued. The result was a solid and painless gait, and patient was able to work as an automobile repairman.

The writer considers that traumatic hip dislocations may be considered as "old", and hence as unsuitable for reduction by manipulation, after four weeks.

A report of five cases in the literature is appended.

J. A. Nutter.

Operative Treatment of Old Hip Disease. Rogers, M. and Peabody, W. C.: *Jour. Orthopæd. Surg.*, November, 1920.

The authors consider that in the first group of cases of old hip disease, namely, those with deformity and firm ankylosis whether bony or fibrous, the treatment has been standardized (osteotomy at or near the great trochanter with correction of the deformity).

The paper considers mainly the treatment of a second group, and it comprises cases showing hip deformity with movement, a portion of the head being left in the acetabulum. This movement in the damaged joint is thought to be the chief cause of the so-called recurrence of symptoms (pain and disability). Here osteotomy is not to be advised on account of the danger of the deformity recurring, and because, not producing ankylosis, it does not prevent the pain due to muscular and ligamentous strain.

Hence an arthrodesis of the damaged joint is indicated, at the same time correcting the deformity. This is now done by the Smith-Petersen approach, the acetabulum and femoral head being rawed and fixed in absolute apposition. Necrotic and even purulent debris may be found and removed, though no attempt is made to remove all pathological material. Fixation is by plaster spica.

A third group, where there is pathological dislocation and absorption of the head, presents a much more difficult problem. Here an attempt is made to place the top of the trochanter in the acetabulum with the leg in abduction, making as stable a joint as possible.

J. A. N.

A Case of Congenital Atrophy of the Femur.
Granjoux, E. and Pecheral, C.: *Revue d'Orthopedie*, September, 1920.

The authors report a case of atrophy of the upper half of the femur in a baby, the shaft tapering off above with neither neck nor small trochanter. No cause could be assigned. The relationship of this deformity to congenital hip dislocation is discussed.

J. A. N.

Permanent Thigh Flexion due to Muscular Anomalies
Fautelais, P.: *Revue d'Orthopedie*, September, 1920.

The writer reports the case of a child with permanently flexed hips, although the hip joints appeared normal. The cause of the deformity, which was of such extent (90° flexion) as to prevent walking, was found to be dense fibrous bands on either side extending from the iliac crests to the sides of the thighs in the track of the tensor fasciæ femoris. These dense bands were cut through by open incision and the thighs allowed normal extension. This condition was thought to be caused by the wearing of a very tight abdominal bandage by the mother during pregnancy, to overcome weakness of the abdominal muscles. J. A. N.

Flail Shoulder.
Ulrich, F. F. A.: *Brit. Jour. of Surg.*, July, 1920.

This paper contains the report of a case of compound comminuted fracture of the head and neck of the humerus, by a shell fragment, with destruction of the deltoid muscle and soft tissues; and fracture of the glenoid fossa and spine of scapula. Wide excision of head and neck of the humerus, with the injured soft tissues, left a flail shoulder in every sense of the word. Both deltoid muscle and circumflex nerve were destroyed, the other nerves being intact. After clearing up sepsis, a six inch tibial bone graft was driven into a tunnel made in the remains of the glenoid fossa, the other end being driven into the medullary canal of the humerus. Previous to this all scar tissue had been removed and the bone ends freshened. The graft was introduced with the upper arm at an angle of 80° abduction from the trunk, and 25° anterior to the coronal plane of body. Some wire was used, attaching glenoid to humerus, but this had to be removed after three weeks owing to persistent sinus. Immobilization for four and one half months gave good bony union, a very useful arm being obtained.

There were three and one half inches of shortening of the arm. There is little doubt but that the bone graft was responsible for the bony union. A very interesting and instructive case. J. A. N.

Sacro-Iliac Sciatica.
Barry, J. A. and Duprey, P. Lemausois: *Revue de Medecine*, 1920, No. 1.

The authors, who are neurologists, in a very excellent article describe the symptom complex "sacro-iliac sciatica", or sciatic pain symptomatic of sacro-iliac disease or injury. The curious point is noted that such sciatica is to be differentiated from ordinary sciatica. Evidently the writers do not agree with the modern view that practically all sciatic pain is secondary to some primary lesion most commonly arising from bone or joint, for example, rheumatoid arthritis of the lumbar spine. It is interesting to note with what persistence neurologists cling to the now discredited doctrine of a primary sciatic neuritis.

Sacro-iliac lesions mentioned as causing sciatic pain are strain, rheumatism, tuberculosis, and suppurative conditions. The use of a sacro-iliac support is recommended.

One of the most interesting features of the article is the anatomical explanation of the path of pain referred from the sacro-iliac joint along the obturator, external cutaneous and anterior crural nerves as well as the great sciatic. J. A. N.

The Treatment of Scoliosis by a Modification of the Abbott Corset.
Broca, A. and Hondre M.: *Revue d' Orthopedie*, September, 1920.

There is little in this paper to remind the reader of the Abbott method of treating scoliosis. The jackets are put on under suspension, an effort is made to reduce the prominent ribs by the introduction of increasing thicknesses of felt pads, and the hollow side of the chest is encouraged to expand by blowing water out of a bottle. After three plaster corsets a cloth corset with lateral steels is used. Good results are claimed. J. A. N.

On Osteo-Synthesis in the Treatment of Pott's Disease.
Calve, J. and Solland, M.: *Revue de Chirurgie*, Paris, 1920, No. 5.

The authors in a lengthy and well illustrated article have much to say in criticism of the methods of Albee and Hibbs in the treatment of Pott's disease. They suggest the use of a short rather than of a long graft, applied early in the disease, limited strictly to the diseased vertebræ, and accompanied and followed by the classical treatment of rest with the spine hyperextended. Their operative technique involves, first the removal of the entire spinous processes and then the formation of a suitable bed for a tibial graft by chiselling outwards the laminar surfaces.

This new method of making a bed for the bone graft appeals to the reviewer more than does the theory of treatment on which the article is based.

J. A. N.

A Study of Persistent Bone Sinuses. Peabody C. W.: *Surg. Gyn. and Obstet.*, November, 1920.

This paper is really the study of the treatment of an infected bone cavity, the resistance to cure of which is well known. The method evolved by the writer, that of extremely radical ablation, by which the disease and its maintaining causes are removed, followed by the application of the Carrel-Dakin technique to prevent reinfection of the newly exposed surfaces and to permit later closures by plastic operation or simple secondary suture, was first advocated by Jacob of Belgium in 1917, and has since been frequently emphasized by Chutro of Argentine. The writer shows a very high percentage of clinical cures, but considers that more time must elapse before it can be definitely shown that these cures are permanent. A very interesting and instructive paper. J. A. N.

Contribution to Bone Transplantation. Leriche, R. and Policard: *Lyon Chirurgical*, July-August, 1920.

The authors insist that the so-called bone graft dies, and is therefore not really a bone graft. After being transplanted and dying, it may be (1) eliminated or expelled, as generally follows in the presence of infection, (2) tolerated by the tissues without being attacked, or (3) absorbed.

As a rule tolerance is a transitory state followed after twenty to thirty days by beginning absorption of the graft. The first phenomenon of absorption is the revascularization of the Haversian canals of the transplant from the vascular connective tissue of the host. Without this the graft does not "take" and to obtain this the graft should be in intimate contact over all of the surface at its extremities with well vascularized and not too dense bony tissue.

The bone graft is regenerated by reconstruction of the Haversian system, which has at first been destroyed. The endosteum plays no special part in the reconstruction. Early resumption of walking with the help of an ambulatory brace is recommended, movement being the best stimulus to reconstruction, once it is determined that absorption of the graft has begun, as shown by its increasing fixity. The author's best cases began to walk one month after the graft has been inserted.

Metallic fixation of the graft is not advocated, and scrupulous hemostasis is insisted upon.

A very well written article, and one that details a knowledge of the later developments in bone graft surgery. J. A. N.

The Pathology of the Renal Pelvis in Two Cases Showing Hæmaturia of the So-Called Essential Type. Quinby, W. C.: *Jour. of Urology*, 1920, Vol. IV, p. 209.

This article is based on the careful pathological examination of two kidneys which were removed for profuse hæmaturia in which diagnosis was made of "so-called essential hæmaturia".

While the cause for the bleeding in both cases was not clear, the site of the hæmorrhage was located just under the epithelium of the pelvis, and to a less extent, in the substance of the papilla. The pathologist could not ascertain whether the condition had been caused by soluble toxins choosing these areas of the kidney as their point of elective action, or whether it was due to bacterial infection. The author recites the fact that renal hæmorrhage in small pox originates not infrequently just in this area, in which case, the causative agent is presumably a toxin.

These findings would explain the beneficial action of pelvic lavage with silver nitrate solution, with a view to causing a definite chemical reaction. In view of the location of the source of the bleeding, such a procedure as nephrotomy would be ill advised, and certainly only after more conservative non-operative measures had been tried. F. S. Patch.

Treatment of Essential Renal Hæmaturia by Intrapelvic Injections of Silver Nitrate. Rytina, A. G.: *Jour. of Urology*, 1920, Vol. IV, p. 317.

The author recommends that after exclusion of all other causes of hæmaturia by all the diagnostic methods available, before resorting to radical or surgical treatment, that conservative, non-operative measures be tried.

He has had considerable success in three cases of hæmaturia treated after the method first used by Geraghty, which consists in an intrapelvic injection of silver nitrate, 4 to 8 c.c. of a 5 per cent. solution. The injection may have to be repeated after a longer or shorter interval, should the hæmaturia recur.

The author is of the opinion that a localized nephritis will be found more often than any other to be the cause of essential hæmaturia. It is important that thorough urological examination be carried out in order to eliminate, as far as possible, the presence of stone, tumour or tuberculosis from the bleeding side.

The explanation for the therapeutic value of this procedure is not known, unless it be the pronounced reaction that results in the kidney pelvis and kidney substance. F. S. P.

Renal Hæmaturia—A Prenephritic Symptom.

Young, Ed., L.: *Surg. Gynæ. and Obst.*, November, 1920, Vol. XXXI, p. 478.

Attention is called to hæmaturia, a symptom which not infrequently is found in a prenephritic stage, nearly always unilateral and very often associated with renal colic. The establishment or exclusion of a primary focus of infection which is extra-renal is essential. The removal of such foci may prevent the onset of nephritis. Dr. Young calls attention to elimination of pus forming organisms from the kidney without damage to renal tissue. Treatment has called for nephrectomy in case of severe hæmorrhage, or nephrotomy and decapsulation. He notes the absence of any pathological lesion in many of these cases or of any signs of chronic nephritis. In the cases operated upon, about one-half were apparently cured. The others recurred and later developed frank clinical evidence of chronic nephritis. R. E. Powell.

Occluded Renal Tuberculosis.

Braasch, W. F.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1307.

The author points out the frequency with which occluded renal tuberculosis is met with and that ureteral stricture of a tuberculous nature is the cause of about 10 per cent. of all renal tuberculosis which is occluded.

He points out the long duration of more or less mild symptoms averaging six and one-half years and the absence of gross findings in the urine, many being normal. In only 15 per cent. were the tubercle bacilli demonstrated in the urine.

Routine *x*-ray is very useful as an aid to diagnosis. The usual symptoms are frequency, dull pain, or abdominal tumour, usually extending over a period of years.

The kidney may be a focus of infection if recently occluded. If occlusion has been present for years, it usually becomes sterile.

If tumour, frequency or pain exists, nephrectomy is indicated, usually with excellent results. R. E. P.

Riedel's Lobe of the Liver Complicating Urological Diagnosis.

O'Connor, V. J.: *Jour. of Urology,* 1920, Vol. IV, p. 97.

The author reports two cases in women in which the presence of Riedel's lobe presented extreme difficulties in urological diagnosis.

Riedel's lobe or linguiform lobulation, is merely a prolongation of the right lobe; it is not necessarily associated with gall bladder disease and occurs most frequently in women. Its development is difficult to explain, but it would seem to occur as an anatomical abnormality, or it may be acquired through conditions tending to force the anterior margin of the right lobe of the liver downward.

It makes diagnosis difficult, particularly in cases in which it is associated with infection of the urinary tract. It may easily be mistaken for kidney or tumour. Pyelography will be of material assistance in the differential diagnosis.

(The new method of oxygen inflation of the peritoneal cavity should offer great aid in distinguishing this condition. The method is safe, and at times illuminating, and it should be used in all vague abdominal conditions.) F. S. P.

Abdominal Pain in Diseases of the Kidney and Ureter.

Cecil, A. B.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV.

Cecil states that pain arising from diseases of the kidney and ureter is often purely abdominal in type. In a series of patients with stone in the kidney and ureter there was pain in every case; 28 per cent. of these presented abdominal pain only, and pain in the back was often associated with abdominal pain.

The confusing nature of abdominal pain was shown by the fact that in this series, 20 per cent. had undergone various surgical procedures for the relief of pain without a change in the symptoms. The position of the stone, whether in kidney or ureter had little bearing on the distribution of the pain. In renal tuberculosis the pain was less trying, never severe, with frequently no pain in the back or abdomen, while in pyelonephritis, abdominal pain was less frequent and less severe.

In hydronephrosis and hydro-ureter the pain was severe and led, in 30 per cent. of the series, to abdominal operations for the relief of the pain which later was shown to be renal in origin.

Other conditions giving rise to abdominal pain were tumours of the kidney, polycystic kidney, congenital malformations of the kidney and nephroptosis.

Those cases exhibiting abdominal distribution of pain are kidney and ureter stones and hydronephrosis. Routine urological examinations are impracticable but abdominal pain becomes a definite indication for complete urological examination when the urine shows abnormalities. M. D. Levy.

The Treatment of Pyelitis in Infancy and Childhood.

Kretschmer, H. L. and Helmholz, H. F.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1303.

The authors recommend the use of the cystoscope and lavage of the renal pelvis with silver nitrate, one half to one per cent. solution, and routine x-ray examinations to exclude calculus. The prevailing organism was found to be B. coli. They show cures in cases which had resisted all other methods of treatment. The paper was freely discussed and some rather strong criticisms offered against the routine cystoscopic examinations of infants and children suffering from infections of the kidney. R. E. P.

Renal Migration of Ureteral Calculus (case report). Neff, J. H.: *Jour. of Urology*, 1920, Vol. IV, p. 111.

The author reports a case of left ureteral calculus in a female which seems to have migrated from a position in the right ureter up to the kidney pelvis, whence it was removed by a pyelolithotomy. The patient had been observed carefully, and thorough examination, including control x-rays, made during the period of observation. The possibility of this occurrence must be borne in mind. It is due either to a dilatation of the ureter or reverse peristalsis. In the author's case, there had been a violent reaction to the first treatment and evidences of a periureteritis, which suggested a temporary complete occlusion of the ureter, naturally followed by ureteral dilatation above the site of occlusion. F. S. P.

The Treatment of Bladder Tumours. Thomas, B. A.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1395.

The article strongly urges the routine use of the cystoscope in every case of genito-urinary disturbance where there is any question of bladder disease. First, for diagnosis and treatment; second, to follow up results of treatment and diagnose early recurrence of tumour.

(1). A histopathological diagnosis should be made in all cases of bladder tumour. The treatment depends upon its character. In non-malignant types, polyp, papilloma, or hæmangioma, fulgurations either with the Oudin or D'Arsonval current, followed by radium needles (12·5 mg.) directly applied to site of tumour; occasionally cystotomy is necessary to remove blood clots.

(2). In selected cases of malignant tumours, especially those involving the vesical orifice, fulguration and radium are indicated with good temporary results, but insufficient time has elapsed to judge of superior lasting effects.

(3). In the case of malignant tumours favourably situated and not too far advanced, radical resection is indicated, supplemented by intense roentgen-ray cross-fire.

(4). In the unfortunate group beyond hope of radical surgical interference, fulguration and radium may be tried. Very few of these cases are amenable to resection of bladder and transplantation of ureters. As a final measure, cystotomy and radical cauterization may be necessary to relieve retention and pain.

R. E. P.

The Surgical Treatment of Malignant Tumours of the Bladder. Judd, E. S. and Sistrunk, W. E.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1401.

A series of two hundred and two cases are reviewed. Attention is called to the frequent diagnosis of benign papilloma snippings where the bases are definitely malignant.

No strongly formed opinion is given of the success of radium treatment. Resection is advised in all cases of early malignant tumour, where the situation is favourable, as offering the patient the best chance of recovery. Fulguration is not markedly beneficial, and indeed has been found harmful in some cases.

R. E. P.

Infiltration Anæsthesia of the Internal Vesical Orifice for the Removal of Minor Obstructions: Presentation of a Cautery Pouch. Caulk, J. R.: *Jour. of Urology*, 1920, Vol. IV, p. 399.

Increasing education of the general public is bringing to urologists cases of prostatic obstruction in their early stages, before any renal deterioration has taken place. These cases are not always amenable to radical operative measures. It has been found that from 14 to 20 per cent. of cases of prostatism are due to contracture of the vesical neck or so-called median bar formation. The Young's pouch has proved a very effective method of curing a large percentage of this type of obstruction, but many urologists have been deterred from its use through fear of hæmorrhage and absorption. Simpler methods, such as high frequency cauterization and ordinary cauterization have not been applicable or effective in the majority of these obstructions, as they do not remove sufficient tissue and the measure has to be repeated and is time consuming. The Chetwood galvano-cautery operation is a major procedure.

The author has modified Young's pouch by substituting for the knife blade an iridio-platinum blade, with which the part is burned through by a low electric heat. Hæmorrahge is prevented, the tissues are sealed and there is a marked freedom from absorptive effects and other complications.

In the author's hands, twenty of these operations have been performed with excellent success. The procedure may be performed under local anæsthesia, the author having designed a special syringe for infiltrating the tissue of the vesical orifice with novocain.

F. S. P.

A Suprapubic Prostatic Retractor. Farr, R. E.: *Surg. Gynæ. and Obstr.*, November, 1920, Vol. XXXI, p. 532.

The author describes a prostatic retractor as an aid in doing suprapubic prostatectomy, thus eliminating the dangers of infection made possible by using a finger in the rectum to elevate the gland during enucleation. He also claims that the operation can be done more readily under local anæsthesia or under a much lighter general narcosis. R. E. P.

A Procedure for the Cure of Prostatic Abscesses. Stevens, A. R.: *Jour. of Urology*, 1920, Vol. IV, p. 249.

The author has made a study of various procedures for the treatment of prostatic abscess, particularly with a view to lessening the time of convalescence and stay in hospital.

He had previously tried various operations:

a. Drainage into the posterior urethra, (1) through a suprapubic intravesical approach, or (2) through a perineal incision opening into the membranous or the bulbous urethra;

b. Drainage into the rectum in selected cases;

c. Drainage into the perineal space through the posterior prostatic capsule, after careful dissection between the prostate and the anterior rectal wall.

The suprapubic approach was abandoned on account of the lengthy time of healing and the resulting weakened abdominal wall.

Perineal drainage through the opening of the abscess into the posterior urethra was unsatisfactory, chiefly because of the prolonged convalescence.

Drainage through the posterior capsule of the prostate, without opening the urethra has apparently been done at the Bellevue Hospital only occasionally, and with unsatisfactory results.

The author has recently employed the methods of aspiration through a needle plunged into the perineum, and opening of the abscess into the posterior urethra by a metal sound. The latter is the one preferred on account of the good results obtained.

It consists in the introduction of a rather pointed sound, with a small curve (Fr. 23) into the urethra. The patient is in the lithotomy position, under gas and oxygen anæsthesia. One finger in the rectum locates the tip of the sound at the apex of the prostate. The sound is introduced about 2 cm. further, turned 90 degrees and with care forced through the lateral wall of the urethra into the corresponding lateral lobe of the prostate. The procedure is then repeated on the opposite lateral aspect of the prostate. Slight pressure on the prostate at this stage usually produces a copious purulent discharge at the meatus. The urethra and bladder are irrigated until clean; no catheter is left in the urethra.

Eight patients have been treated by this procedure; in all but one instance gross pus was discharged at the urethral meatus after the sound operation. In no case was there more than trivial hæmorrhage. The average stay of this group of patients in hospital after the sound operation was six days, whereas in fifteen consecutive perineal sections for drainage of prostatic abscess into the posterior urethra performed during the year previous to this work, the average stay in hospital after operation was thirty-one days.

F. S. Patch.

Spinal Anæsthesia in Urology. Smith, G. G.: *Jour. of Urology*, 1920, Vol. IV, p. 237.

The author strongly urges the use of spinal anæsthesia for urological operations on the lower urinary tract, particularly in patients with poor heart or kidneys, or any other condition in which ether anæsthesia is attended by risk. He uses the method in almost every prostatectomy, in cases of retention due to stricture, in cystoscopy with irritable bladders, particularly in tuberculosis, where otherwise urethral catheterization would be difficult.

The author uses a 5 per cent. solution of novocain, the total amount injected being 2 c.c., the content of novocain being ·05 gram, the patient being given a small hypodermic injection of morphia, one-half hour before operation. The injection is made between the second and third lumbar spines, the patient being in a sitting position. The specific gravity of the solution used by him is 1007, which approximates very nearly to the specific gravity of the cerebrospinal fluid.

The author has been fortunate enough to have had no serious results with the method. Headaches do occur, and may be severe, but always disappear inside of two or three weeks. Vasomotor collapse is probably the real danger and is probably due neither to the toxicity of the drug, nor to paralysis of the vasomotor centre, but to a paralysis of the vasomotor fibres regulating the tone of the blood vessels in the splanchnic area, which are given off from the spinal cord from the second to the seventh dorsal segment.

Anæsthesia lasts for a period of one to two hours. It is accompanied by a marked flaccidity of the abdominal muscles, a condition which is most helpful in prostatectomy, or operations in which a relaxed lower abdominal wall is desired.

Nausea and vomiting sometimes occur, due to lowering of blood pressure by paralysis of the splanchnic roots. In such cases re-breathing is very efficient in stimulating respiration and thereby pumping the blood out of the large abdominal veins into the general circulation.

The method is valuable in that it enables the patient to take water immediately after operation, which is advantageous in patients with low renal function.

The author cautions that spinal anæsthesia should not be used when local anæsthesia will suffice, and concludes with the remark that the objections to spinal anæsthesia largely disappear with familiarity.

F. S. P.

The Treatment of Gonorrhœa of the Male Urethra. Keyes, E. L.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1325.

Dr. Keyes strongly urges against over treatment and the use of strong injections. He recommends argyrol 10 per cent., as an anterior injection and acri-flavine, 1-5000 for irrigations.

He condemns the passing of instruments into an acutely inflamed urethra, but thinks sounds are of greatest value in breaking gonorrhœal nests in the chronic cases. He strongly recommends complement fixation as a test of cure, in addition to bacteriological tests, pointing out that the fixation remains positive in complicated cases long after the gonococcus is dead.

He finds no benefit in vaccines either in the acute or chronic stages and depends on immobilization in his treatment of gonorrhœal arthritis, in conjunction with ridding the patient of his local foci. R. E. P.

A Study of Mercury Injections by Means of the Roentgen Ray. Cole, H. N., Littman, S. and Sollmann, T.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1559.

The authors have made a study of the rate of absorption of certain soluble and insoluble intramuscular mercury injections by means of *x*-ray examination. The only study previously made is that reported by Fournier that grey oil injections are absorbed by the fourth day after injection. These findings the authors were unable to confirm.

They found that mercuric salicylate had an average rate of absorption, when administered intragluteally, of four days; calomel of fifteen days and that grey oil remained unabsorbed during the entire period of observation, an average of forty-three days.

It would therefore appear that the dangers of cumulative poisoning are greatest with calomel and grey oil, and that from the slowness and irregularity of absorption, they are more likely to be inefficient.

Mercuric salicylate injections, in doses of one to two grains, particularly into the gluteal muscles, have a satisfactory rate of absorption and present relatively little danger. F. S. P.

Method of Treating Congenital Syphilis. Fordyce, J. A. and Dosen, I.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1385.

The article reveals a clear and concise method of treatment of congenital syphilis using intramuscular injections of bichloride of mercury (made up in Palmatin to render it slowly soluble) and neo-arsphenamin.

Attention is called to erratic changes in the Wassermann reaction and its unreliability before the tenth day. A negative test may persist with active lesions.

The dosage of neoarsphenamin is well tolerated by infants. They show a table of doses using 0·075 grammes in infants from three to eight weeks; 0·1 grammes from two to six months; 0·15 grammes from six months to one year, and 0·15 to 0·2 grammes from one to two years. The dosage of bichloride being from 0.1 grammes in infants to two to three week increasing as child gets older. A child of two years will stand 0.25 grammes. They find serological cures in about one year after using about eighteen doses of neo-arsphenamin and twenty-four to thirty-two doses of mercury. R. E. Powell.

Blood Transfusion. Durham, Roger: *Long Island Med. Jour.*, October, 1920, Vol. XIV, p. 387.

This paper is a review of present day citrate and syringe cannulæ-valve methods. The sodium citrate method receives the endorsement of most workers who agree with the findings of the committee of the American Expeditionary Force (Crile, Boggs, Cannon, Moss, Vincent, Lee). This body endorses it for the army because of (1) Its simplest technique. (2) Simplest equipment. (3) It has given uniformly excellent results in a large number of cases and the presence of the citrate has resulted in no practical disadvantages.

It certainly produces a larger number of reactions especially with transfusions of large amounts of citrated blood. The toxic dose of citrate may be considered to be five grammes.

The author leans to the use of a modified Miller syringe cannula method which he does not describe.

C. K. P. Henry.

Various Methods of Blood Transfusion, Applicable to Various Ages. Strauss, A. A.: *Surg. Clin. of Chicago*, November, 1920, Vol. IV, p. 987.

The author uses two Luer glass syringes of 100 c.c. capacity. The veins of the donor and patient are dissected and cannulæ with stoppers are introduced. Sodium citrate in 2·0 per cent solution is freely used on the wounds and in the cannulæ and syringes. An adapter for the syringe to fit the cannula is employed and between syringe filling the stoppers plug the cannulæ.

He advises for infants the transfusion of 50 to 100 c.c. of blood into the superior longitudinal sinus, using the Braun needle which has a shoulder one eighth of an inch from the point. No preliminary blood tests are needed in infants transfused from either parent.

In children under six years he advises dissection of the external jugular vein and gives 150 to 250 c.c.

C. K. P. H.

Injuries of the Heart and Blood Vessels. Makins, G. H.: *Brit. Jour. of Surg.*, July, 1920, Vol. VIII, p. 107.

The article explains by text and drawings a series of unique specimens in the Museum of the Royal College of Surgeons of England. The illustrations, many of which are full page photographs of A. K. Maxwell's drawings, are beautiful examples of the best of the printer's art. Many cases are cited where death did not occur for hours or days after cardiac perforation. Foreign bodies in the cardiac chambers have been shown to travel to distal arteries; in one case the foreign body entered the posterior wall of the left ventricle and came to rest at the bifurcation of the left common iliac artery. In the section on vessel injuries a strange case is cited of aortic wounding by a piece of shell which perforated the stomach and was vomited. This man died on the fifth day after injury. Illustrations of bullets in the femoral artery and external iliac artery are shown, in the former the patient recovered after excision of the portion of penetrated artery. Cases of travelling bullets are cited; Captain Fry's case of a patient who lived one month after a bullet entered the left external iliac vein and came to rest in a branch of the left pulmonary artery! *Traumatic Aneurysms.* Several cases of arterial hæmatoma following wounds of the thoracic aorta, iliac artery, abdominal aorta and other vessels are shown. Arteriovenous aneurysms are illustrated. One case of false aneurysm of the thoracic aorta ulcerated into the œsophagus thirty-seven days after injury. The whole article is a wonderful résumé of injuries to the heart and larger blood vessels, and of value to those interested in vascular surgery.

C. K. P. H.

Unfiltered and Filtered X-Ray Dosage. Witherbee, W. D. and Remer, J.: *Amer. Jour. of Roentgenology*, October 1920.

Witherbee and Remer contribute an article on *x*-ray dosage, submitting a series of formulæ for filtered and unfiltered rays. The standard of roentgen ray dosage is known as the "erythema dose", that is, the quantity of roentgen rays necessary to produce an erythema of the skin in from ten to fourteen days after exposure. This is greater than the epilatory dose, or the quantity of rays necessary to cause the hair to fall without erythema to be followed by complete re-growth of the hair. This smaller dose is spoken of as "one skin unit" and is equivalent to four Holzknecht. The four fundamental factors to be considered in *x*-ray dosage are: (1) The pressure or voltage expressed in kilovolts or in spark gap. (2) The quantity of current expressed in milliamperes. (3) The duration of the exposure expressed as time in minutes. (4) The distance from the centre of the target to the skin surface. The distance in inches between the spark gap terminals corresponds approximately to the number of kilovolts. The actual determination of the spark gap is just the amount of voltage that will give a spark across the terminals without the tendency to arc, and which, at the same time, maintains the milliamperes desired in the tube. The dosage necessary to produce one skin unit will depend upon whether the rays are filtered or unfiltered, and if filtered, upon the thickness of the filter and upon the material of the filter. The formulæ submitted for filtered rays are worked out with aluminum, varying in thickness from $\frac{1}{4}$ mm. to 7 mm. For unfiltered rays, the spark gap in inches multiplied by the milliamperes, multiplied by the duration of the exposure in minutes, divided by the distance of the target from the skin surface, squared, will determine the dose administered during an exposure. For filtered rays there is an important difference in the equation, namely, the spark gap multiplied by the milliamperes, multiplied by the time is divided by the distance only and not by the distance squared. The fraction obtained is then compared with the proper normal fraction and it will be seen readily whether the dose is greater or less than one skin unit. This is of value not only in treatment but also in radiography, for one can readily determine the number of exposures which may be made of a part with any technique without injury to the part.

The following are a few of the formulæ contained in the article:

1. *Unfiltered Rays.*

$$\frac{\text{3 inch spark gap x 3 milliamperes x 4 minutes}}{\text{8 inches x 8 inches}} = \frac{9}{16}$$

the normal fraction for one skin unit, equivalent to 4 Holzknecht. This will cause the hair to fall without erythema within ten to fourteen days, to be followed later by complete re-growth. The same fraction may be obtained with the following variations of the spark gap, milliamperes or time:

$$\frac{\text{6 inch spark gap x 3 milliamperes x 2 minutes}}{\text{8 inches x 8 inches}} = \frac{9}{16}$$

Here the spark gap is doubled and the time halved.

$$\frac{\text{3 inch spark gap x 6 milliamperes x 2 minutes}}{\text{8 inches x 8 inches}} = \frac{9}{16}$$

The milliamperage has been doubled and the time halved.

The standard formula for an erythema dose is 45/64 as follows:

$$\frac{\text{3 inch spark gap x 3 milliamperes x 5 minutes}}{\text{8 inches x 8 inches}} = \frac{45}{64}$$

2. *Filtered X-ray Dosage.*

Each thickness of aluminum requires a separate standard or formula for one skin unit. Three examples are given below:

1 mm. Aluminum.

$$\frac{\text{9 inch spark gap x 5 milliamperes x 1 m. 54 s.}}{\text{10 inches}} = \frac{171}{20}$$

3 mm. Aluminum

$$\frac{\text{9 inch spark gap x 5 milliamperes x 2 m. 34 s.}}{\text{10 inches}} = \frac{231}{20}$$

5 mm. Aluminum

$$\frac{\text{9 inch spark gap x 5 millamperes x 7 minutes}}{\text{10 inches}} = \frac{63}{2}$$

Lack of space renders it impossible to include all the points mentioned in this article. Suffice to say that although the formula method of estimating dosage is by no means new, nevertheless the article will serve to emphasize the importance and accuracy of the standard formulæ in *x*-ray dosage. Not only is it possible to establish a safe and satisfactory technique, but also given any three of the four fundamentals, the fourth can always be determined readily and accordingly the danger of over-stepping the margin of safety in either treatment or radiography minimized.

W. A. Wilkins.

Rœntgenographic Study of Bronchiectasis and Lung Abscess after Injection of Bismuth Solution through the Bronchoscope

Lynah, H. L. and Stewart, W. H.

Amongst the interesting papers read at the Minneapolis meeting of the American Roentgen Rays Society held in September, 1920, was one with the above title.

No doubt this paper will appear in due course in the Journal of the Society, but attention is here directed to the subject so that those who are interested in the study of pulmonary abscess or bronchiectasis may be aware of what is being done in the way of diagnosisor treatment.

The mixture employed in this procedure was a non-irritating mixture of bismuth carbonate in sterile olive oil, in the proportion of one of bismuth to two of oil, the quantity being 8 c.c. introduced slowly by means of a curved cannula. With the bronchoscope introduced, the patient is instructed to cough and that portion of the bronchial tree identified from which the pus is seen to come. This portion is then injected with the bismuth and oil mixture. It is necessary to work quickly and to make the radiograph as soon as possible after the injection. This means that the manœuvre should be carried out in the radiographic room or that a portable apparatus should be available in the operating theatre.

This method was employed in five cases, and a feature of note is that all the patients were benefitted to such an extent that they asked for re-injection.

The authors were led to undertake this method of injection because it has been the experience of many roentgenologists that the accidental entrance of bismuth into the lung in cases of œsophageal fistula has been followed by no ill effects to the patient. Moreover, in abscess of the lung or bronchiectasis it is often extremely difficult to localize or map out accurately the size and extent of the cavity by ordinary methods.

No doubt this procedure will be of value in certain cases, but it appears to be heroic and not without its risks and has difficulties attached to it which we believe will prevent it from being adopted as a routine procedure in the investigation of bronchiectasis or lung abscess.

W. A. W.

Brachial Birth Palsy and Injuries of Similar Type in Adults.

Taylor, Alfred S.: *Surg. Gyn. and Obst.*, 1920, Vol. XXX, p. 494.

The author affirms that there is a necessity to bring forward this subject because of the widespread belief that a spontaneous cure will result in nearly all these cases if treated by non-operative methods such as massage and correction of posture. This view he states is entirely erroneous. The majority do not recover good function no matter how much time or care is used. He disagrees with Thomas' view that the condition is the result of a subluxation of the shoulder joint, and holds that it is wholly due to a stretching of the cervical roots by the dragging apart of the head and shoulder. This results in a temporary paralysis if the strain is slight, but in complete rupture or evulsion of the root if the stretching is sufficient. The strain is felt first in the upper root and this may alone be affected or all fine roots may be torn across. There is in addition nearly always a tearing of the deep cervical fascia and the scalenus muscle. The characteristic attitude, inversion, pronation and flexion of the wrist and fingers, if uncorrected results in permanent deformities of the bones, joints and muscles of the affected arm. In many cases at operation there is found a complete severance of one or more roots which could never recover unless sutured. Prolonged delay makes operation more difficult on account of scar tissue. The slighter cases which get well spontaneously do so within three months. The author therefore recommends that the operation should not be delayed beyond this period unless there is marked improvement shown. He speaks from a sixteen years experience of two hundred cases; seventy of these he has operated on. In some he was able to do nothing. There were no perfect anatomical and physiological results but nearly all were improved and many recovered almost complete function. Only ten were seen within two months after birth and of these, two recovered without operation. Many of the cases operated on had been treated for years without benefit.

The article is well illustrated, the position taken definite and reasonable. The post-operative mortality is, however, high, three out of seventy, even though the deaths might equally have occurred in any operative procedure on young children. F. A. C. Scrimger.

MEDICINE

The Meltzer-Lyon Method in the Diagnosis and Treatment of Gall Bladder and Biliary Duct Disease. Lyon, Vincent B. B.: *Amer. Jour. Med. Sciences*, October, 1920.

Lyon's work is based on Meltzer's observation at the Rockfeller Institute (A. J. M. Sc., 1917) that local application of 25 per cent. magnesium sulphate solution to the duodenum by means of the duodenal tube, relaxes the sphincter of the common duct and permits the ejection of bile. This action depends on the "Law of Contrary Innervation" which Meltzer enunciated.

In support of this theory, there is a considerable amount of experimental evidence, notably, as shown by Bruns of Pavlov's School, that no bile appears in the duodenum so long as the stomach is empty; but when a meal is taken, the entrance of chyme into the duodenum leads to a discharge of bile from the common duct. Rost found that an injection of peptones or albumoses through a duodenal fistula in a normal dog, caused immediately a discharge of bile from the ampulla—and he proved that this takes place by reflex—causing a contraction of the gall bladder—and simultaneously a reciprocal relaxation of the common duct sphincter. Furthermore, this reflex depends on the integrity of the gall bladder; for after cholecystotomy, the escape of bile is continuous, rather than discontinuous, as it is normally. The nervous mechanism has been demonstrated by Doyen and Freese.

To B. B. Vincent Lyon of the Jefferson Medical School, Philadelphia, this seemed to open up possibilities towards investigating conditions of the biliary tract. His paper which appears in the *American Journal of Medical Sciences* for October, 1920, is convincing as to the practicability of the method, and up to the date of publication, over 300 cases had been tested with a total of 2240 drainages, covering a wide range of biliary tract conditions.

The method employed is as follows: (1) A preliminary mouth wash with potassium permanganate, 1 in 1000, is given, followed by a rinse with weak zinc chlorid solution. (2) Then the duodenal tube, sterile, is introduced into the fasting stomach and residuum aspirated for study, as to gross appearance, chemical findings, microscopy, etc. (3) The stomach is rinsed thoroughly and then the patient is given a glass of water to drink and turned on his right side with the hips elevated by a pillow. It takes 15 to 40 minutes for the bulb to enter the duodenum. This is determined by a change in reaction to litmus, by the "tug" on the tube, the pearly gray character of the fluid aspirated, by the fact that fluid taken by mouth cannot be aspirated, or, by aid of the x-rays. Pylorospasm may be overcome by atropine. Normally, in the fasting state, the duodenum is bile free, and the sphincter closed. Assured that the bulb is in place, 50-100 c.c. of 25 per cent. warm sterile magnesium sulphate solution is introduced through the tube from a syringe. In a few minutes, bile appears, and this can be collected by gentle vacuum suction or by gravity drainage—into separate sterile bottles for study. The separation is made by gross appearance judged through the glass canula at the end of the tube. The bile first collected is diluted with magnesium sulphate, but soon this becomes light golden yellow, transparent and of medium viscosity. It varies from 10-30 c.c.; it is designated "A" bile and is considered to come from the bile ducts. Suddenly, the colour deepens to a darker golden yellow, is more viscid, but remains transparent in health. In health, this "B" bile should not exceed 75 c.c. (as the capacity of the normal gall bladder is 1½-2½ oz.). It is believed that this fraction is derived from the gall bladder—for the following reasons: (1) The colour and viscosity denote a higher concentration and pathologically, in inflammation and stasis, this bile is thick and sometimes greenish black, similar bile being found in the gall bladder at subsequent operation. The cellular and crystalline elements are more numerous; and further, an amount of 3-5 oz. which may be obtained pathologically, could hardly be derived from the common and hepatic ducts with their total length of 8¼ inches and average diameter of one quarter inch. In addition, this bile is not obtained where the gall bladder has been removed; and when pathological, it is found to clear up under drainage by this method.

The next change is to a light, lemon yellow, transparent bile, thinner and more limpid. The flow is intermittent, but may amount to several ounces, depending on how long the sphincter remains relaxed. This "C" bile comes from the liver cells.

Pathologically, certain changes are characteristic. In *choledochitis*, grossly, the "A" bile is off colour, turbid, more viscid, with excess of flaky mucus. Microscopically, there are pus cells and epithelial cells, and cultures may show bacteria—especially if associated with cholecystitis.

In *cholecystitis* without choledochitis, "A" bile is relatively normal, but "B" bile shows a change in colour from a deep golden yellow to dark molasses or greenish black, it is turbid, more viscid, and contains flaky or stringy mucus. Pus cells and desquamated epithelium are seen, and cultures will be positive.

In *cholelithiasis*, besides the evidence of cholecystitis, we find a deposition of bile crystals, which is often sufficient to impart a gritty or sandy feel to the bile.

The method is offered: (1) As an aid in *diagnosis* of biliary tract affections. (2) As an *alternative treatment* in those cases in which surgery is not clearly indicated. (3) As a supplementary method, post-operatively, of *continuing biliary drainage* in those cases incompletely cured by surgical means alone. (4) It has also been employed with striking success in the *treatment of catarrhal jaundice*, the average duration of the illness—as measured by the persistence of jaundice, being reduced from 35 days to 17 days, in a series of cases treated at the U. S. Naval Base Hospital at Brest, and reported by Lyon in the *American Journal of Medical Sciences* for April, 1920. (5) It may be employed in *typhoid convalescence* to ascertain if the gall bladder remains infected; although since the introduction of the high calory diet by Coleman, the complications of cholecystitis seem on the wane. This, Lyon thinks, may be due to the fact that the high calory diet supplies proteoses and peptones to the duodenum, and so initiates the reflex for the gall bladder to contract and discharge its bile.

Occasionally it may be impossible to collect bile from the gall bladder by this means; for instance, where there is a stone obstructing the cystic duct; or it is obstructed by adhesions; where there is hydrops of the gall bladder from swelling of the mucus glands at the neck; or when gall stones completely fill the sac.

A. T. Henderson.

The Modern Examination of the Stomach. White, Franklin B.: *Clinics of North America*, September, 1920.

The writer describes the present as a time when our ideas are in a state of transition, and passes in review all the different methods and means of examination, and gives his opinion of their relative value. He urges the importance of a careful history, and thorough general physical examination.

All the different methods of examination have their failings and we must make our diagnosis on the summing up of the findings of all methods, and by the ruling out of disease elsewhere; in the heart, kidney, lungs and nervous system. No one method can establish an absolute diagnosis but each gives valuable information.

The history tells us much, the physical examination is chiefly important in finding out diseases elsewhere that give rise to reflex stomach symptoms; the examination of the stomach secretions, by means of the test meals or fractional methods of Rehfuss and the examination of the stools, give us important additional information.

The roentgen ray examination he considers the most important single method but shows how lesions in certain positions show no abnormality. In such cases pathological findings will be found with other methods, such as the benzidin test.

The importance of a follow-up system to check up any doubtful or special point is insisted upon. The variations of the normal stomach in size, shape, position and motility must be known and appreciated, as no two stomachs are alike, any more than are any two faces.

R. H. M. Hardisty.

Errors in the Diagnosis and Treatment of Duodenal Ulcer. Dunham: *Amer. Jour. of Med. Sciences*, November, 1920.

The importance of a careful history and a thorough physical examination is insisted upon, and in addition a chemical analysis of the stomach contents and stools, and an *x*-ray examination of the chest and abdomen should be done in all cases.

The frequency of visceral syphilis is pointed out and the necessity of a blood count and Wassermann test in all cases. The writer quotes authors who say, that before thirty years of age inherited syphilis is the cause of 90 per cent. of gastric and duodenal ulcers, and that 10 per cent. is due to acquired syphilis—the writer does not accept those figures but says that many of his doubtful cases were cleared up by finding a positive Wassermann.

In all cases a rigid course of medical treatment should be carried out in a hospital for four weeks, and then if there is no improvement, and lues excluded, operation should be done.

R. H. M. H.

"Dumping Stomach" and the Results of Gastro-jejunostomy. Operative Cure by Disconnecting Old Stoma. Wyllys, Andrews and Mix: *Surgical Clinics of Chicago*, October, 1920.

The patient had had digestive disturbances for years and had a gastro-jejunostomy performed in November, 1917. He became worse after the operation although still, for part of the time at least, under treatment.

He was seen in 1919 and the *x*-ray examination of the stomach showed that the stomach contents were immediately emptied into the bowel through the gastro-enterostomy opening: This was done so rapidly that there was great difficulty in getting a plate taken before the barium left the stomach. He was operated upon and the gastro-jejunostomy undone and some adhesions the probable cause of his original digestive disturbances broken down. Some months later the patient reported himself better and gaining weight. Interesting to note is the fact that the patient said that after a drink, the fluid seemed to rush down through his bowels, and also that at the time of operation an intense enteritis was observed in the jejunum the result of the passage of undigested food and acid secretion into the bowel.

R. H. M. H.

Treatment of Hyperemesis of Pregnancy. Rathery, F. and Bordet, F.: *Annales de Medecine*, 1920, Vol. VIII, p. 92.

F. Rathery and F. Bordet (p. 92), report four cases of uncontrollable vomiting of pregnancy, persisting for from one to two months, with extremely severe symptoms, cured by adrenalin hydrochloride, after all other methods of treatment had failed. This was given in from one to two milligrammes daily for from four to seven days, either hypodermically, (in 250 c.c. of normal saline), or per rectum, or when possible by mouth. Vomiting ceased at once; acidosis disappeared, and blood pressure was practically unaffected, no matter by what method it was administered. They found that intravenous injections of glucose failed to affect the acidosis as much as did the adrenalin injections. J. L. D. Mason.

The Treatment of Seasickness. Cheinisse, L.: *La Presse Medicale*, November 6, 1920, p. 798.

L. Cheinisse (p. 798), on "The Treatment of Seasickness," refers to various methods hitherto employed to overcome the cerebral anæmia believed to be the cause of it, and which is really only a secondary phenomenon. He explains the theory of Professor P. Nolf of Liege, that seasickness is due to abnormal stimulation of the vestibular apparatus by the unusual motion, and that this in turn affects the nerve centres in the bulb, particularly that of the vagus, producing the cardiac and gastric symptoms.

As a result of this theory he employed atropine,—for its well-known action on the vagus,—in a series of cases extending over four years. The results were uniformly successful, with but a few exceptions (probably due to too small doses). These should be sufficient to produce the physiological effect of diminished secretions, and a moderately increased rate of pulse.

Ordinarily two milligrammes of atropine sulphate divided into three doses, and given by mouth at half-hour intervals from the time of departure are sufficient. Or one milligramme hypodermically may be administered for immediate action. Very susceptible subjects should take half a milligramme three or four times daily throughout the journey.

Mr. Pierre Cazamian, physician-in-chief of the French Navy, reports similar success, adding six milligrammes of adrenalin divided into three doses by mouth at half-hour intervals, in cases of low arterial tension. J. L. D. M.

Tuberculosis and Influenza. Hawes, J. B.: *Boston Med. and Surg. Jour.*, November 18, 1920.

The author quotes the observations and conclusions of a large number of eminent authorities, either in charge of, or actively associated with tuberculous sanitaria, where a good opportunity availed itself during the recent influenza epidemics to study the relations between tuberculosis and influenza, and arrives at the following conclusions:

1. Influenza is a serious, but by no means a hopeless or fatal complication of tuberculosis.
2. It is possible that a tuberculous patient possesses a certain degree of immunity against influenza.
3. Post-influenzal bronchitis may disguise a newly awakened pulmonary tuberculosis. Prolonged cough and physical depression following influenza should make one suspicious, and the patient should be kept under constant supervision.
4. Influenza and its effects render the early diagnosis of tuberculosis increasingly difficult.

Influenzal changes in lungs have been classified as pulmonary tuberculosis. Many cases of tuberculosis have been discovered or made active on account of influenza. J. Kaufmann.

Mononuclear Leucocytosis in Reaction to Acute Infections ("Infectious Mononucleosis"). Sprunt, T. P. and Evans, F. A.: *Johns Hopkins Hospital Bulletin*, November, 1920.

The conclusions in this paper are based on a study of six cases. Each case exhibited a mononuclear leucocytosis in reaction to an acute infection, and the information obtained from the study leads to the following conclusions:

1. A mononuclear leucocytosis is met with in adults as a reaction to an acute infection.
2. The leucocytosis is made up largely of pathological forms, probably all lymphoid in origin.
3. The symptoms and signs in these cases are so much alike that they may be considered provisionally as a clinical entity.
4. In the early febrile stages these cases cannot be differentiated with assurance from leukæmia, but the subsequent course makes the diagnosis clear.
5. Recovery took place in all the cases. J. K.

Non-Tuberculous Lung Changes Following Pneumonia. Packard, E. N.: *Jour. Amer. Med. Assoc.*, December 4, 1920.

The author presents a study of non-tuberculous changes in the lungs occasioned by pneumonia and its accompanying pleurisy, and concludes as follows:

1. On account of the recent high incidence of pneumonia, a great many chronic lung changes will be encountered in the next few years.
2. The permanent changes unlike tuberculosis are almost always basal; they are mainly of the nature of a fibrosis, and bronchial dilatation, and frequently infection.
3. Abnormal apical physical signs should be considered as due to pulmonary tuberculosis until proved not to be. Basal signs should be considered non-tuberculous until definitely proved so. (Lawrason Brown.) J. K.

Effect of Tonsillectomy on the Recurrence of Acute Rheumatic Fever and Chorea.

LAWRENCE, W. ST.: *Jour. Amer. Med. Assoc.*, October 16th, 1920.

THIS is a study of the results of tonsillectomy on ninety-four children at a special cardiac clinic. The cases were all carefully observed for varying periods before operation and for a long period afterwards. No cases followed for less than two years after operation are included. The majority were examined at monthly intervals between the time of operation and of writing. They had all had some of the rheumatic group of manifestations such as acute rheumatic fever, chorea, myositis, bone and joint pains, and tonsilitis.

The tonsils were markedly hypertrophied in 13 per cent., moderately so in 69 per cent., and not enlarged in 18 per cent. of the cases. They all had palpable tonsilar lymph nodes before operation and in 40 per cent. afterwards. All of the latter number were, however, greatly reduced in size. He insists on the necessity of post-operative examinations as he found a second operation necessary in one-fifth of the cases.

Sixty per cent. showed no recurrence of the above rheumatic manifestations, following the operation. It must be borne in mind, though, that all of them were under constant supervision by the physician and a social worker and their mode of living must have been greatly improved. Of forty-two cases who had previously had rheumatic fever only seven had a recurrence following this operation. One-half of the chorea cases had recurrence. Nutrition and general health were improved, and intercurrent disease was less common after the tonsils were removed.

Basal Metabolism Determinations in General Internal Diagnosis.

THE basal metabolism in any normal individual is found to vary but little from day to day and from year to year, provided the weight remains unchanged. Metabolism in the individual, however, is found to vary under many conditions. The intake of food, muscular work and exposure to cold are common factors which cause an increase, and certain pathological conditions, as fever, acidosis and disturbances in the internal secretions, give rise to definite changes.

In basal metabolism we are dealing with a factor nearly as constant as body temperature and because of the light it throws upon the calorific requirements of the body, quite as interesting. The author states that basal metabolism determinations have been placed on a practical clinical basis by the Benedict portable apparatus, and the next step is for clinicians to determine the range and value of its clinical application in routine diagnosis. Basal metabolism determinations have been more widely directed to the problems connected with alterations in the secretion of the thyroid than to any other clinical problem up to the present.

In a recent paper (*Jour. Amer. Med. Assoc.*), April 3rd, 1920, Dr. G. W. McCaskey discussed its value as an index to the severity of the poisoning in hyperthyroidism. The routine determination of its amount is in his opinion worth while.

1. In all cases of definite goitre, especially in those cases associated with health disturbances, to ascertain the degree of the toxicity.

2. In the large group of cases either with or without goitre, in which symptoms are present resembling either closely or remotely those of thyrotoxicosis.

In regard to the first group, whenever a patient with a goitre has impairment of health, whether the symptoms are typical or not of thyrotoxicosis, the toxicity of the goitre should be determined by this method. This is especially true when discussing the nature and character of therapeutic measures whether medical or surgical. It is of the first importance in judging of the operative risk in thyroidectomy, and it furnishes a quantitative index of the effectiveness of treatment.

Equally important and presenting great diagnostic difficulties, is the second group indicated. Among the symptoms suggesting investigation along these lines may be mentioned, psychoneurotic disturbances; circulatory disturbances: (a) tachycardia or bradycardia. (b) cardiac myasthenias. (c) certain arrythmias; fine tremors; hyperidrosis and hypoidrosis; general debility; loss of weight; slight temperature disturbances.

Not one of the foregoing symptoms can be regarded as strongly diagnostic much less pathognomonic of hyperthyroidism or hypothyroidism. In fact, if the majority or perhaps all of these symptoms were present in an individual case, the syndrome might still be due to some affection entirely apart from thyroid disease. Differentiation from thyrotoxicosis can usually be made with a certain degree of probability by the general clinical picture, but the final court of appeal as far as the thyroid problem is concerned must rest in the determination of the basal metabolism.

Dr. McCaskey concludes his paper by presenting a series of cases in which basal metabolism determinations furnished the decisive factor in a diagnosis, which could not have been otherwise made, owing to the presence of other conditions, which masked the clinical picture. F. R. BROWN.

The Value and Mechanism of the Colloidal Gold Test.

CRUICKSHANK, J.: *Brit. Jour. of Exp. Path.*, April, 1920, Vol. I.

IN an interesting article the author explains in so far as known the mechanism of the colloidal gold reaction, adding original observations of his own. In

1917 Felton showed that the zonal reactions were dependent upon the relative amounts of globulin and albumin present in the cerebro-spinal fluid, the former exerting a precipitating action, the latter a protective one. By varying the amount of albumin present the author was able to convert a marked paretic reaction into a meningitic one. Furthermore by separating out the globulin from negative fluids he was able to show that the paretic reactions were not solely due to the increased globulin content *per se*, but that an alteration had taken place in the physical and chemical character of the globulin. Human blood serum likewise in its globulin fraction exerts a precipitating power. The albumin has only protective powers. Of other animals tested that from the rat alone precipitates gold.

News

ALBERTA

A series of recommendations regarding the handling of tuberculosis in Calgary, drawn up by Drs. C. S. Mahood and A. Fisher, were recently placed before the Provincial Minister of Health and the Provincial Health Officer, and are under favourable consideration at present. They suggested that the tuberculosis situation in that city be handled as far as possible by the Provincial Health Department; that the Tuberculosis Sanatorium at Bowness recently erected by the Dominion and the Alberta Provincial Governments, be permitted to care for advanced as well as incipient cases; that provision for a central Tuberculosis Clinic be made at the Calgary General Hospital, and that the Mount View Hospital be reserved for a few very advanced cases, and used for a Diagnostic Clinic. It was further suggested that a grant be given to the city of Calgary if a Tuberculosis Clinic be started there.

An interesting address was delivered to the Calgary Medical Society on October 5th last, by Mr. R.M. Bennett, K.C., on "The Physician and the Law". The part of the physician was both as an ordinary witness, when he is only required to state facts, and as an expert witness when a certain degree of technical skill is demanded by the Court. The subject of collection of debts and malpractice was touched upon. A vote of thanks to the speaker was passed. At the next meeting of this society on October 19th, Dr. E. Sisley gave a paper on "Internal Pre-operative, Operative, and Post-operative Treatment", in which he pointed out that in the present ideal state of aseptic surgery, atoxis in the form of relieving the internal economy of accumulations should be looked to.

On November 2nd another legal address of much interest was given by Mr. Clifford T. Jones, K.C., on "The Unsound Mind and the Law". At the close the speaker laid stress on the shameful way insane patients are often treated in this country in being arrested as ordinary criminals and tried in the civil courts before commitment. Dr. Fisher explained that the Calgary General Hospital had six wards for observing patients thought to be insane prior to their commitment to the Provincial Hospital for the Insane. Dr. Stanley moved that the Calgary Medical Society request the Executive of the Alberta Medical Society to appoint a committee to meet with the committee of the Law Society, to take up the whole matter of insanity with the committee recently appointed by the Dominion Government for the purpose of revising the Statutes. This was seconded by Dr. Merritt and carried.

At the annual meeting of the Academy of Medicine of Edmonton, held on December 1st, the following officers were elected: Honorary President, Lieutenant-Colonel R. H. Brett; President, T. H. Prust; First Vice-President, L. C. Conn; Second Vice-President, W. D. Chappelle; Treasurer, R. F. Nicholls; Secretary, H. H. Hepburn; Executive Committee, J. J. Ower, Wm. Dickson, and J. F. Adamson; Hospital Advisory Board, J. S. Wright, A. F. Anderson, A. R. Munro, J. MacD. Oswald, E. Allin, T. H. Whitelaw. The address of the retiring President was an admirable one and much enjoyed by those present. Dr. Whitelaw, M.O.H., presented a statement on the serious nature of the smallpox outbreak in Edmonton for the last year. It showed that there had been 221 cases of smallpox, of which 100 were of school age or under. There were two deaths. None of the 100 children had ever been successfully vaccinated. Of the 221 cases, only 15 had ever been successfully vaccinated and these were all adults from 38 to 75 years of age, who had a rather indifferent vaccination in infancy. The statement showed that the vaccination law which had become inoperative five years ago through anti-vaccination propaganda, and through the apathy of the medical profession, had not yet been amended by the Provincial Board of Health, and that as a consequence many of the younger children attending the schools had been neglected, over 60 of them under 12 years of age having recently been affected. An osteopathic physician resident in Edmonton recently published a statement opposing vaccination in which he grossly libelled the medical profession and a discussion took place as to how he was to be disciplined. The opinion, strongly supported by His Honour the Lieutenant-Governor, Dr. Brett, was unanimous that his name should be struck off the roll of the College of Physicians and Surgeons for his offence and that he was and is a menace to the health of the community. A special meeting was arranged for the 15th of December, of the Academy, to which Provincial Officers were to be invited, as well as the Press. It was expected that publicity would then be given to the fact that the medical profession is a unit in favour of vaccination as a preventive of smallpox, and that the insidious campaign of the anti-vaccinationists should not be taken seriously by the public.

Medical Societies

THE CANADIAN MEDICAL WAR MUSEUM, THE OSLER PATHOLOGICAL COLLECTIONS AND THE HISTORICAL EXHIBIT OF THE HOTEL DIEU, AT THE EXHIBITION OF THE CONGRESS OF THE AMERICAN COLLEGE OF SURGEONS.

A novel feature of the Montreal Meeting of this Congress, held on October 12th to 15th last, and one which awakened much appreciation as contributing greatly both to the interest and to the academic character of the proceedings, were the exhibitions held for the benefit of the members at McGill University, and at the Hotel Dieu Hospital. A very important part of the whole was the splendid exhibit contributed on this occasion from the Canadian Medical War Museum by permission of the Director General of Medical Services, and which was set up in the Assembly Hall of the Medical Building at McGill University. The war material shown was collected in France and was prepared for the Dominion Government in the workshops of the McGill Medical Museum under the direction of the Curator and the Museum Staff. The display presented was of an imposing and most attractive character, and it was in some respects unique. The most spectacular part of it was undoubtedly the series of war injuries of bone presented by Major L. J. Rhea, which were collected and prepared by him directly after the autopsy, often with the help of *x*-ray plates taken before death, and which bear the hall-marks of scientific observation and careful study as well as of manual skill; and the serial drawings and casts of reconstructive surgery of the face, presented by Majors F. E. Risdon and C. W. Waldron. Other exhibits in the series of great interest were the gunshot wounds of soft tissues, and injuries of the respiratory tract by noxious gases by Major F. B. Gurd; water colour paintings of traumatic lesions of the fundus of the eye, by Colonel S. H. McKee; prosthetic appliances and type deformities due to nerve lesions by Colonel C. L. Starr; *x*-ray lantern slides of war injuries by Major A. H. Pirie; a series of fifty-two water colour sketches made by Canadian War-Office artists showing Army Medical arrangements in the field; captured German gas-apparatus, and other trophies; and the first Canadian overseas flag, shown by the Dominion Government.

The entire war exhibit was presented in book form in a detailed descriptive catalogue, which was of more than passing interest, in that it summarized the work done on the material mounted and prepared for the Canadian Medical War Museum to date.

The other section of the Congress Exhibition at McGill was held in the Museum of the new medical building. Here the greatest interest centred around the large pathological collections made by the late Sir William Osler during his term as pathologist to the Montreal General Hospital and an historical exhibit of records, pictures, and books bearing upon this work and upon his Canadian period. Other exhibits were: researches into the cancer problem by Professor A. Peyron, of the Pasteur Institute; studies in the circulation of the heart by Dr. Louis Gross; and pathological series by the Museum Staff.

Two symposiums were held during the Congress in its museum. The first was upon the war specimens, Major-General F. J. T. Fotheringham in the chair; the second was upon the Osler pathological and historical exhibit and was addressed by Dr. Norman Gwyn, Professor F. J. Shepherd in the chair.

An extremely interesting historical exhibit showing records, pictures and relics bearing upon the early history of old Montreal and of its oldest hospital, the Hotel Dieu (founded in 1642), was held at that institution under the auspices of the French section of the congress. It was largely visited and was much appreciated

Books Received

The Systematic Treatment of Gonorrhœa in the Male. By Norman Lumb, O.B.E., clinical assistant, St. Peter's Hospital for Stone. Second edition, 123 pages. Price $1.75. Publishers: Lea & Febiger, Philadelphia and New York, 1920

A Text-book of Biology, for students in general, medical and technical courses. By William Martin Smallwood, Ph.D., professor of comparative anatomy in the Liberal Arts College of Syracuse University. Fourth edition, thoroughly revised 308 pages. Price $3.50. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

The Essentials of Histology, Descriptive and Practical For the Use of Students. By Sir Edward Sharpey Schafer, F.R.S., professor of physiology in the University of Edinburgh. Eleventh edition, 575 pages. Publishers: Lea & Febiger, Philadelphia and New York, 1920. Price $4.50.

Scurvy: Past and Present. By Alfred F. Hess, M.D., clinical professor of pediatrics, University and Bellevue Hospital Medical College, New York City. 279 pages with illustrations. Publishers: J. B. Lippincott Co., Philadelphia, London, and 201 Unity Building, Montreal, 1920.

Public Health and Hygiene. In Contributions by Eminent Authorities. By William Hallock Park, M.D., professor of bacteriology and hygiene, University of Bellevue Hospital Medical College, etc. 884 pages. Price $10.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

Surgery: Its Principles and Practice. For Students and Practitioners. By Astley Paston Cooper Ashhurst, A.B., M.D., F.A.C.S., associate in surgery in the University of Pennsylvania, etc. 1202 pages. Price $10.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

Syphilis. By Lloyd Thompson, Ph.B., M.D., physician to the syphilis clinic Government Free Bath House. Second edition, thoroughly revised, 486 pages. Price $7.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

Diagnosis and Treatment of Brain Injuries With and Without a Fracture of the Skull. By William Sharpe, M.D., professor of neurologic surgery, New York Polyclinic Medical School and Hospital. 757 pages with 232 illustrations. Price $8.00. Publishers: J. B. Lippincott Co., Philadelphia and London, and 201 Unity Building, Montreal, 1920.

Anæsthetics, Their Uses and Administration. By Dudley Wilmot Buxton, M.D., B.S. Sixth edition, 548 pages. Price 21/- net. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

Anniversary Tribute to George Martin Kober. In Celebration of his Seventieth Birthday. By his Friends and Associates, March 28, 1920. Francis A. Tondorf, S.J., Ph.D., *American Journal of Physical Anthropology.* Vol. iii., January-March, 1920. Washington, D.C., 1920. 381 pages.

Anxiety Hysteria: Modern Views on Some Neuroses. By C. H. L. Rixton, M.D., M.R.C.S., senior neurologist, Ministry of Pensions' Neurological Hospital, and D. Matthew, M.C., M.B., Ch.B., with a foreword by Colonel Sir A. Lisle Webb, K.B.E., C.B., C.M.G., 124 pages. Price 4/6 net. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

International Clinics. A Quarterly of Illustrated Clinical Lectures and especially prepared original articles on treatment, medicine, surgery, etc. Edited by H. R. M. Landis, M.D., Philadelphia, with the collaboration of Chas. H. Mayo, M.D., and others. Volume iii., Thirtieth Series, 1920. 297 pages. Publishers: J. B. Lippincott Co., Ltd., Philadelphia and London, and 201 Unity Building, Montreal, 1920.

Principles of Biochemistry. For Students of Medicine, Agriculture and Related Sciences. By T. Brailsford Robertson, Ph.D., D.Sc., professor of physiology and biochemistry in the University of Adelaide, South Australia. 633 pages. Price $8.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

Book Reviews

PHYSIOLOGY AND PATHOLOGY OF THE CEREBRO-SPINAL FLUID. By WILLIAM BOYD, Professor of Pathology, University of Manitoba. Publishers: The MacMillan Co., New York, 1920.

THIS book is a really masterly exposition based on an exhaustive survey of the literature and a thorough knowledge of the cognate researches to date, of a subject of absorbing interest alike to physiologist, surgeon and internist. As is known to us all, the study of cerebro-spinal fluid has yielded much, and under the increased refinement of modern methods promises still more, both in general diagnosis and therapy, and in the solution of the obscure problems of neuro-psychiatry. Dr. Boyd has approached it from the standpoint of the trained pathologist, whose province it is to trace the bearing of the anatomical considerations and physiological principles involved upon the problems of disease that confronts the clinician as practical issues. That his vision has been sharpened by personal experience gained at the bedside, and broadened by a knowledge of the Masters of Medicine is evident from the dedication, "To my old teacher and Chief, Byron Bramwell," and the quaint opening inscription from Magendie. The result is a volume, which in simplicity of treatment and lucidity of style and really fascinating presentment of important facts has probably not been equalled by any Canadian author since Osler's "Diagnosis of Abdominal Tumours" appeared. The publication of this book is thus to be regarded as a real event in Canadian Medicine, and it may fittingly be taken as representative of that new era of production upon which we are entering now. The bookmaking is excellent, and the coloured plates with which it is enriched are remarkably fine. The literature is covered by a complete bibliography.

The subject-matter is divided into two parts. The first, general, part gives a historical introduction and deals with anatomical considerations and various physiological problems, such as the origin of the fluid from the choroid plexus and arachnoid surface as an "elective filtration"; its mode of circulation from the cortex downward and upward from the spinal sub-arachnoid; its rapid absorption through the arachnoid villi into the venous sinuses, and the subsidiary mechanism of the lymphatics of the neck; its freedom from noxious elements in the circulating blood thanks to the barrier set up by the choroid plexus; its mechanical, protective, and metabolic functions; the degree and variations of its pressure and the conditions on which the latter depend; its physical and chemical properties and its normal and pathological cytology. The procedure of lumbar puncture and its applications is outlined, and the technique of the Wassermann and colloidal gold reactions is given with much simplicity. The substitution of the mastic test for the latter, and the possibility of the very early diagnosis of syphilis by using a cholesterized heart antigen with relatively large amount of spinal fluid, are noted.

The second, general, part is devoted to the consideration of those diseases in which examination of the cerebro-spinal fluid may be of help in the diagnosis, or intraspinal therapy effective. Therapeusis is considered under two heads, (*a*) drainage, and (*b*) injection of sera or drugs. A fruitful field for research is indicated. The book is stimulating as well as suggestive. It should be in the hands of every practitioner, and on the shelves of every laboratory. M. E. A.

DISEASES OF CHILDREN. Presented in Two Hundred Case Histories of Actual Patients selected to illustrate the Diagnosis, Prognosis and Treatment of the Diseases of Infancy and Childhood, with an Introductory Section on the Normal Development and Physical Examination of Infants and Children. By JOHN LOVETT MORSE, A.M., M.D., professor of pædiatrics, Harvard Medical School. Third edition, 639 pages with illustrations. Price, $7.50. Publishers: W. M. Leonard, 711 Boylston Street, Boston, 1920.

THIS is the latest addition to the Case History Series of medical text-books. It is again made obvious that it is much more instructive, as well as interesting, to study a book of notes on actual cases than to refer to a text-book of the older type in which all possible symptoms and signs are given. One rarely if ever sees a "typical text-book case". The difference between the two types of book is that between a living child and a catalogue. The cases are grouped under the various systems and organs; two hundred patients are clearly described. Nearly one-third of the book refers to the alimentary tract and disease of nutrition. The problems of infant feeding are fully discussed. The introductory chapter (Sixty-two pages) on the Normal Development and the examination of children is the most valuable account of the normal child known to the reviewer and is to be recommended to those teachers who claim that Pædriatics is merely the study of disease occurring in young patients. Material added to the earlier editions refers to blood-pressure tables, congenital obliteration of bile duct, neosalvarsan pertussis vaccine, tables of food values, pneumococcus meningitio, infantile paralysis, diabetes mellitus and insipidus, etc.

Numerous illustrations add to the value and interest of the book. The index is unique in that one is enabled to quickly turn to any disease or to groups of similar cases successfully differentiated. Necropsies and pathology are not considered. Thus the author assumes a great deal of knowledge and experience in the reader and his book is not recommended as the first book on pædriatics to be bought by a medical student, though it cannot be too highly praised. F. M. F.

Cerebro-spinal Fluid; In Health and in Disease. By Abraham Levinson, B.S., M.D., Associate in Pædiatrics, North-western University Medical School, etc., Chicago, with a Foreword by L. Hektoen, M.D., 225 pages with 56 illustrations and 5 coloured plates. Price, $3.00. Publishers: C. V. Mosby Co., St. Louis, 1919.

That over 200 pages of valuable information on cerebro-spinal fluid can be brought together is proof of a great increase in our knowledge of this subject in the last few years. A very interesting historical sketch (from the days of Hippocrates) forms the first chapter. The anatomy and physiology concerned is fully discussed, and all details of techinque required in procuring the fluid are given. An exhaustive description of all properties of the normal fluid forms a valuable chapter, while the most interesting portion to a practitioner, perhaps, is that devoted to examination of the fluid for diagnostic purposes. This chapter is unusually clear and practical. A systematic account of pathological charges grouped under the various diseases is an additional aid, while the final chapter takes up intraspinal treatment (epidemic meningitis, tetanus, syphilis, etc.). Sixty illustrations are clear and practical. For a book in the English language, the bibliography is strikingly full, and is alone worth the price of the book.

Report from the Department of Pathology and the Department of Clinical Psychiatry, Central Indiana Hospital for the Insane. 1915-1916 and 1916-1917. Vol. vii. Wm. B. Burford, Contractor for State Printing and Binding, 1919.

This volume contains the reports from the Department of Clinical Psychiatry and Pathology of the Central Indiana Hospital for the Insane for the fiscal years of 1915-1916 and 1916-1917. It is a most comprehensive report. Until recently and even now by many people, a hospital for the insane was simply regarded as a place where people suffering from mental disease were thrown and forgotten. Anyone who reads the report of the Central Indiana Hospital for the Insane soon learns that the insane in some institutions at least are getting as intensive care and treatment as is accorded to the sick in any of the other realms of medicine. Each patient is regarded as an individual study and judging from the report, he obtains an examination from every view point of medicine. He is not simply classified as insane and forgotten. He is studied from the psychiatric, neurologic, medical, surgical and chemical standpoint. The Indiana Hospital has also been of great help to the community by giving a full course of lectures and clinics to not only the students of the University of Indiana, but to practising physicians and to the Indianapolis Medical Society. The report is well written and exhaustive in its presentation. G. S. M.

Hand Book of Sanitary Law. By B. Burnett Ham, M.D., D.P.H. Eighth edition, 16 mo., pp. Price, 5/–. H. K. Lewis & Co., Limited, London, 1920.

Sanitary Law is one of the most difficult subjects required for the Diploma of Public Health, and students preparing for the diploma are extremely fortunate in having such a book as "Burnett Ham" at their disposal.

It is not a text-book, but simply a crambook, and as such can be strongly recommended to students and others for whom it is intended. This, the eight edition, shows great improvement over all previous editions. Every chapter has been revised, enlarged and brought up to date.

The publishers are to be congratulated on having secured, as editor, so distinguished an authority on public health as Dr. Henry R. Kenwood. R. St. J. M.

An Introduction to Bacteriology for Nurses. By Harry W. Carey, A.B., M.D., assistant bacteriologist, Bender Hygienic Laboratory, Albany, N.Y. Second revised edition, 149 pages. Price $1.25 net. Publishers: F. A. Davis Company, Philadelphia, Pa., 1920.

This little book is a brief but comprehensive survey, written in sufficiently simple language and without undue detail, of the facts of bacteriology, and of those elementary principles of scientific medicine that govern the reactions of infection and immunity to disease, and that underlie the treatment and prognosis of the individual case. It is another of the large series of Nursing manuals now appearing, which aim at the higher theoretical education of the trained nurse with a view to qualifying her to be the intelligent co-operator of the surgeon. The subject is well and clearly treated, and is brought up-to-date in this, the second edition of the work. The book is completed by a glossary of terms. M. E. A.

Theory and Practice of Nursing. By M. A. Gullan, Sister Tutor of St. Thomas's Hospital. 214 pages. Price 10/6 net. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

Any book that summarizes the instruction given to the Nurses in Training at the Nightingale School of the St. Thomas' Hospital is bound to claim our immediate respect, and this little volume maintains the traditions of its school. As the title implies the entire field of medical and surgical practice is briefly reviewed, first from the theoretical side and then from the practical standpoint of the bearing of this upon the range of nursing activities. The physiology of the various vital processes and the nature, prognosis, and treatment of the various groups of disease are outlined. Special chapters are also devoted to the subjects of pulse, temperature, the intake of food, the technique of enemata, lavage, catheterization, baths, local applications, administration of drugs, and the examination of urine. A mass of practical information upon standard methods and the rationale of their application is thus brought together, making this valuable nursing manual, vade-mecum and guide.

The book is quite evidently written by a nurse and not a physician. As a nursing manual, however, it is the gainer by this, for it combines with a grasp of first principles, an insight into the Nurse's part and art. M. E. A.

A TEXT-BOOK OF PHYSIOLOGY: For Students and Practitioners of Medicine. By RUSSELL BURTON-OPITZ, S.M., M.D., Ph.D., associate professor of physiology, Columbia University. 1185 pages with 538 illustrations. Price $7.50. Publishers: W. B. Sanders Company, Philadelphia and London, 1920.

In many ways this is an excellent account of modern physiology from the medical point of view. The book in the main is compiled along conventional lines. A few points demand attention. It is doubtful whether it is well when writing for students to defer the consideration of dietetics, digestion, and absorption until quite so late a part as Part VIII (p. 985).

Chapter XL, "The Seat and Nature of the Oxidations," should have come much nearer the chapter on the history of the food-stuffs; and if reductase was to be mentioned at all, it should have been referred to in the chapter in which internal respiration was being discussed, instead of being merely placed in a list of enzymes as late as page 989. It is there described as performing only deoxidations, whereas, as Fraser Harris has shown, it can reduce many substances possessing no oxygen at all.

More might have been said about the various proofs of the circulation of the blood adduced by Harvey; students should know exactly on what that great generalization was based. The index to the book strikes one as, in some respects, curiously incomplete, for instance: the names of Head and of Sherrington do not occur in it. The views of Edridge-green on colour vision are not alluded to, nor is the work of Barany on the semi-circular canals. Head's recent views on the primitive sensory functions of the optic thalamus are not mentioned.

Whereas one or two diagrams are rough, the majority of the 538 are excellent, and some are quite new. D. F. H.

STUDIES ON EPIDEMIC INFLUENZA. Clinical and Laboratory Investigations. By MEMBERS OF THE SCHOOL OF MEDICINE, UNIVERSITY OF PITTSBURGH.

A notable contribution to the literature of influenza has been published by members of the Faculty of Medicine of the University of Pittsburgh. The studies embrace a series of articles dealing exhaustively with all sides of the disease and form a mine of information on the subject.

Dr. Johnston, in an interesting and exhaustive review on the history and epidemiology of the disease, shows clearly that the features of the great epidemic 1818-1819 are repetitions of a malady known for centuries. Short, in 1510, refers to three striking features in the epidemic of that period, in the presence of nose bleed, pneumonia and the great danger to pregnant women. In 1693 Molyneux of Dublin called attention to the comparative immunity of aged individuals, a fact which has been impressed by recent experience, although by no means a rule in many of the recurring waves of the disease.

The belief, formerly almost universal and even yet prevalent amongst the laity, that unfavourable weather conditions favoured the prevalence of the disease, was denied by English physicians in 1775, and as early as 1752 and 1762, Whyte and Baker expressed similar views, but that the malady was contagious does not seem to have occurred to these observers. That weather conditions have little or no influence on the prevalence of the disease is shown by the United States experience of 1918-19 when fine clear weather prevailed in most of the large centres where the malady was epidemic. The prevalent belief in the dependence of the disease on unfavourable meteorological conditions is a good illustration of the persistence of tradition.

Ample proof exists that at least one case must exist in a family or community before the disease becomes epidemic. Amongst numerous records a striking instance of contagion is reported from Masontown, Pennsylvania. A musician from a neighbouring city was unwell on arrival and was prostrated by the disease after the evening's performance. From this primary case the town was swept by the epidemic. Institutions such as schools often enjoyed immunity as long as a strict quarantine was observed, and the disease only made its appearance in these institutions after relaxing the regulations.

The clinical description of the disease by Dr. Lichty and the treatment by Dr. McLachlin with a section on the blood and urine should be carefully read by clinicians. A useful classification into two types is suggested, the one involving the upper air passages and resulting in an ordinary influenza, the other affecting the lower respiratory tract and culminating in bronchial-pneumonia. Respiratory symptoms occurred late or early at some period of the disease in all cases.

In the treatment Dr. McLachlan speaks with some confidence in the value of citrated blood or serum from convalescent pneumonia cases and his own results support other observers in the use of this method.

The prevention of influenza is discussed fully by Dr. Haythorn, chiefly in the light of American experience.

The results obtained from vaccines prepared from Pfeiffer's bacillus and from mixed vaccines are not encouraging. Indeed the large number of cases developing shortly after the use of Pfeiffer bacillus vaccine suggests a negative phase and the writer advises caution in exposure in recently vaccinated individuals. There is no reference to the encouraging results published by Leishman, in both morbidity and mortality, from the use of a mixed vaccine.

Dr. Holman's article on bacteriology presents the results of a painstaking investigation and strongly supports the view that Pfeiffer's bacillus is the cause of the disease. In thirty-two cases he was able to isolate this organism from 25 to 78 per cent. In the seven negative cases technical difficulties prevented the isolation of B. influenzæ, even if it had been present. It thus fulfils one of Koch's postulates. Details of other infecting organisms are fully described.

The pathology of the disease is dealt with by Dr. Klotz. An excellent description is presented of the morbid changes in the air passages and lungs, and is well illustrated by coloured plates. The frequent development of bronchiectasis is attributed to the weakening of the bronchial wall by the high grade of injury to the tubes in the inflammatory stage.

An interesting feature of the article is the extensive change in the muscles, consisting in degeneration and hæmorrhages, occasionally resulting in rupture which has been seen in the recti muscles. Dr. Klotz suggests that these anatomical changes may be responsible for the severe pains which are such a striking clinical manifestation of the disease.

We can cordially recommend the perusal of the remaining articles in the book as authoritative statements to those interested in the subject of influenza.

F. G. F.

Human Parasitology. With Notes on Bacteriology, Mycology, Laboratory Diagnosis, Hæmatology and Serology. By Damaso Rivas, B.S. Bio., M.S., M.D., Ph.D., assistant professor of parasitology, University of Pennsylvania. 715 pages, illustrated. Price $8.00 net. Publishers: W. B. Saunders Co., Philadelphia, London, 1920.

This is a good book. It is complete and logical in the arrangement of its material. The indices of authors and of subjects, as well as the list of references to original observations, are satisfying in their usefulness. The treatment of the subject is thoughtful. While accepted explanations of obscure points are given, dogmatism is avoided and, by the acknowledgement of uncertainty in reference to matters unknown, the imagination of students is stimulated.

The scope of the work is encyclopædic since it attempts to cover the whole range of living things which may be parasitic upon man. The attempt is as nearly successful as such an effort may be. The general excellence of the work is so high that occasional unhappy occurrences are the more striking. These will undoubtedly be rectified in the next of the many editions through which this valuable addition, in English, to the discussion of human parasitology will certainly run.

J. L. T.

Medical Electricity, a Practical Handbook for Students and Practitioners. By H. Lewis Jones, M.A., M.D., F.R.C.P. Eighth edition. Revised and edited by Lallum Wood Bathurst, M.D. Price 22/6 net. 575 pages. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

This is one of the best works to date on this subject. The chapters on first principles along with those on the construction and working of the various electrical modalities are clear and comprehensive in spite of the absence of complicated formulæ.

That portion of the work devoted to therapeutics is commendable for its detail as to technique.

The principles and use of the condenser discharge in muscle testing and treatment is of special interest.

The chapter on ultra-violet radiation, owing to the increasing importance of the subject is very opportune.

On the subject electro-therapy generally, one would, however, very much welcome something further in the way of authentic physiological research.

N. B.

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ON THE TREATMENT OF ACUTE EMPYEMA

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MR. PRESIDENT: I assure you I am deeply appreciative of the honour of appearing before you to deliver the Address on Surgery. It is no less a privilege than a responsibility, and I confess that I thought long and seriously before deciding upon a subject for presentation. I trust my choice will be acceptable to you and that I may be forgiven for confining myself to what might better be termed a "paper", rather than the grander title for which I am given credit on the programme.

My reasons for choosing acute empyema are:

1st. It is a world-wide disease, affecting all ages, both sexes, all classes of society and in all climates.

2nd. Its treatment has been the subject of debate and difference of opinion for years, and of late has demanded the "spot-light", because of the large increase in numbers of cases during the influenza epidemics.

3rd. The experiences in thoracic surgery during the war have had a definite influence upon the treatment of empyema, according to the manner in which these experiences have been interpreted.

4th. It is a disease which results in a considerable economic waste in mortality, or disability, temporary or permanent.

5th. It is of interest alike to the physician and to the surgeon.

It is not my intention to exhaust the whole subject of empyema, but to deal only with a review of the treatment of the common every-day cases seen so frequently by all of us.

For all practical purposes, empyema may be defined as an infection of a pleural effusion, secondary, in almost every instance, to a pulmonary lesion. This pulmonary lesion may be only a bronchitis, but it is usually a pneumonia, and empyema is its most common complication or sequel. This is the type of which I would speak.

As there are two types of pneumonia, *i.e.*, lobar and lobular (or broncho-) pneumonia, so there are two types of empyema which complicate these pneumonias. Not only do the types run parallel along clinical lines, but also along bacteriological findings.

Lobar pneumonia is a primary disease with sudden onset in an individual previously healthy. The complicating empyema appears, as a rule, late, when the lung infection is subsiding or has subsided. The infecting organism is one of the pneumococci.

Lobular or broncho-pneumonia is usually an infection of the lung secondary to infection elsewhere; it may be a pharyngitis, a laryngitis or a general infection such as one of the exanthemata or an influenza. The complicating pleural infection appears early in the course of the disease, while the lung infection is still active. The infecting organism is most frequently a streptococcus either hæmolytic or non-hæmolytic.

In the epidemic type in Armies the incidence of empyema in lobar pneumonia is only about 17 per cent., in non-hæmolytic streptococcal infections about 10 per cent., but in hæmolytic streptococcal infections it is 50 per cent. The mortality rate in all is high, varying from 10 to

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An address before the Saskatchewan Medical Association, July 6th, 1920.

walls, hence drainage and rest. The pleural abscess is no different from abscess elsewhere.

Moreover, the needle cannot remove the coagulated lymph which is constantly present frequently in large mass. The advocates of aspiration will tell you that this mass liquefies. What liquefies it? The proteolytic action of the leucocytes and of the infecting organism. But if the infecting organism has lost its activity and there is in consequence but little leucocytosis, the clot remains and becomes organized with the formation of dense permanent adhesions. True, the empyema is cured, but permanent limitation of the pleural function persists.

The injection of solutions in the endeavour to dissolve the coagulum is sometimes used. It is conceivable that proteolytic ferments would be efficacious, but the dangers of secondary infection are present, as these ferments are destroyed by all methods of sterilization. The citrate solutions which *prevent* the coagulation of albuminous fluids are of absolutely no avail in liquefying a clot once formed. The injection of chemical bactericides not only deters liquefaction of the clot, but by adding irritation assists in the formation of further fibrous tissue on the surface of the pleura.

Puncture Drainage with Negative Pressure. This method also falls short of the indications in that it does not remove the coagula. It furthermore entails an enormous amount of attention and care on the part of the nursing attendants, and like all mechanical devices, does harm if it is not perfect in all its details.

For the past two decades there has been presented from time to time a technic and apparatus modified to overcome certain weak points in this method, such as leakage round about the drainage tube, blocking of the tube with coagulum, manometer measurement of the degree of vacuum pressure and the maintenance of a continuous rather than an intermittent negative pressure. In the hands of the enthusiastic originators, these apparata give excellent results, but by the great body of surgeons they have been tried and discarded as not productive of results worth the labour entailed.

Thoracotomy and thorough mechanical cleansing of the pleural cavity with immediate air-tight closure and subsequent repeated aspiration. Theoretically, this method appeals. It apparently came into vogue as the result of the war experiences with wounded chests. Unfortunately, it more frequently fails than succeeds. With wounds of the chest with hæmothorax it is known that:

A. Sterile hæmothorax, if large, the clot should be removed by open operation, because the presence of blood clot stimulates formation of organized fibrous tissue and permanent adhesions.

B. Infected hæmothorax should be treated by open operation and removal of all clot as the clot is a focus of mass infection.

In both instances there should be immediate air-tight layer closure of the wall and repeated aspiration of the effusion which may accumulate. But there is no parallel between these cases and empyema. In the infected hæmothorax the infection comes from without and by excision of the track of the missile and the removal of the clot, almost all the infecting organisms are removed. The pleural tissues are healthy and capable of destroying the small amount of infection remaining.

In empyema, however, the cleansing of the pleural cavity does not remove the source of the infection at all. It is the pleural tissue which is the site of the active infective process and not the contents of the pleural cavity. Moreover, it is difficult to get a closure which remains tight, as the pleural surface which is sutured is not healthy as in wounds of the chest, but is œdematous and infiltrated and itself infected and liable to break down.

Injections and Irrigations. Chemical bactericides of various kinds have been used as injections and irrigations, continuous or intermittent, with the idea of sterilizing the cavity and thus getting rapid closure.

A full discussion of this point would open up the whole question of the treatment of infected wounds and localized infections. It suffices to repeat that in empyema the seat of active infection is in the pleural tissues and not in the cavity; and to point out that the use of chemicals adds irritation to the already irritated pleural membrane and tends to promote the formation of thick layers of organized fibrous tissue. There is no exception—Dakin's solution is the last one to fall under the ban.

In instances of foul putrefactive pus it is permissible to flush out the cavity in order to mechanically cleanse it of decomposing masses of lymph sticking to the wall. Normal saline meets all the requirements and is not harmful.

Rib Resection with Continuous Drainage.—Technic. By physical signs, x-ray and needle exploration, the lowest point of the abscess is defined and the rib immediately above is chosen for resection. The site of election is a point midway between the posterior axillary line and the scapular line. The position of the patient is a semi-prone one, the affected side uppermost with the shoulder and hip supported and the arm hanging straight down over the side of the table. The other arm is placed behind the patient and parallel to the trunk. This position exposes the field; draws the latissimus dorsi muscle well up and gets the scapula out of the way. There is no undue pressure on the normal side and the supports to shoulder and hip permit of thoracic and abdominal respiration being carried out without difficulty.

Local anæsthesia is used—novocaine I per cent. with adrenalin, preceded half-an-hour by a hypodermic of morphia to quiet distressed respiration.

The infiltration is completed prior to the skin incision being made as it is easy to infiltrate succeeding layers to the periosteum and then with the point of the needle enter the space between the two intercostal muscles and deluge the intercostal nerves above and below.

The incision is made over and parallel to the rib dividing the overlying muscles with sharp strokes of the scalpel between spasmodic contractions.

The periosteum is stripped in the usual way and one to one and a half inches of rib removed. Any bleeding points are carefully secured.

The point of the scalpel then enters the cavity followed by a director, and the pus is allowed to escape slowly. Enlargement of the opening is made with the scalpel from time to time as the flow of pus lessens. Finally the size of the opening is increased to the entire length of the resected field.

The finger is inserted and the cavity explored to define its boundaries. If bands of adhesions are present these are broken down to merge all pockets with the main cavity.

Loose coagula are removed by fingers or forceps and the cavity sucked dry.

Dry gauze swabs in curved forceps are used to gently curette the entire surface of the cavity, removing loosely attached lymph clot.

This frequently induces bloody oozing which is of no moment.

The manipulations with finger and gauze excite violent coughing which not only helps to expel fluid and coagula, but in recent cases expands the lung to completely fill the cavity.

A rubber drainage tube of large size is inserted and fixed to the skin margin with a silk worm gut suture. Partial closure of the superficial wound and applying massive dressings complete the operation.

A few comments on points in the technique may not be amiss.

If on resection it is found that the margin of the cavity extends below the level of the opening by more than one inch, a portion of the rib below should be removed It is essential for the best results that the drainage should be from the lowest point of the cavity.

The incision parallel to the rib requires division of fibres of the latissmus dorsi, but only of its lateral margin. The incision at right angles to the ribs, splitting the latissmus dorsi and widely separating it to allow of deeper incision parallel to rib has no advantage in securing better ultimate function of the muscle and has the disadvantage of exposing a much larger area to infection and cellulitis.

Infection of the superficial tissues follows in almost every case but does not spread, provided no attempt has been made to close the wound. The only closure permissible is that obtained by one or two sutures leaving open spaces for drainage.

The drainage tube should be large, but only of sufficient length to pass through the thickness of the wall. The tube should be soft, in order to prevent injury by it to the lung. For this purpose the end should be trimmed square, a lateral opening cut half-an-inch from end and then the whole tube cut from end to end in a spiral. This converts the tube from a rigid to a flexible one.

Rib resection has, in my opinion, every advantage over thoracotomy between the ribs:

1st. The rib is a definite structure to determine the depth of incision.

2nd. All bleeding can be secured before pus is allowed to flow and it permits of gradual enlargement of the opening into the cavity by cutting through avascular tissue rather than through muscle fibres.

3rd. It affords sufficient space for exploration and drainage without the use of retractors to widen the space; and, with local anæsthesia traction on the tissues is not permissible.

The incision between the ribs takes less time, but time is no object. Operation for empyema should never be an emergent one. If there are distressing symptoms of pressure or a severe toxæmia the case is not one for operation but for palliative aspiration, with radical operation to follow upon temporary improvement of the patient's general condition.

After Treatment. The patient is put to bed and propped up to ensure dependent drainage. The degree of inclination is adjusted to meet the amount of myocardial weakness which may be present. But the position is important inasmuch as if some portion of the cavity be lower than is the drainage point pus may collect, be walled off by adhesions and require a second operation for its evacuation.

Dressings are changed or re-inforced as often as the discharges soak through. The dressings should cover a wide area and be firmly applied to avoid the possibilities of a secondary infection.

On the second day the tube should be replaced by one much smaller or, if the amount of discharge be small, it may be left out altogether.

From this time on daily dressings should be done at which time the patient should be directed to cough forcefully. Small pieces of coagulum may present at the wound and require removal. Unless these come away the wound will not heal promptly. At each dressing distinct sucking through the wound should be demonstrated and ensured by passing into the cavity a forceps or director permitting the escape of any accumulated fluid. The director is thus used until no track remains, or no fluid escapes, or the fluid changes to clear serum.

At times the amount of fluid accumulating between dressings is so large, 10 to 20 drams, as to warrant the insertion of the smallest rubber tube for a day or two.

The patient is allowed up and about and encouraged to use the blowing bottles as soon as his general condition will permit.

A high calory diet should be given to recompense for the high proteid waste of the exudate.

The *x*-ray is valuable, not so much as an aid in diagnosis, but as a means of watching progress after operation and to determine the presence of localized pockets.

In cases which are promptly recognized and brought to operation the discharge ceases in about ten days at which time the patient is quite convalescent and there is no asymmetry of the thorax. The lung is completely inflated and there is no shadow suggestive of thickened pleura.

Years ago it was demonstrated that when the air met with more resistance in entering the pleural cavity through the wound than in entering the lung through trachea and bronchus a pleural negative pressure was established with each inspiration. In this method of treatment the above conditions are established promptly upon the removal of the large tube on the second day.

Summary

Infected pleural effusion should be treated by simple aspiration and not by operation.

Frank pus in the pleural cavity is an indication that an abscess, large or small, has been walled off by adhesions, that local and general immunity to the infection is being established and operation is indicated without further delay.

The operation best suited for all cases is resection of rib over the most dependent portion of the cavity, exploration and gauze curettage of the walls, continuous drainage and early removal of drain. By this means a cure with complete expansion of the lung is effected in from eight days up, according to the period of time between the appearance of pleural abscess and operation.

Radical operation is not an emergent treatment to meet urgent symptoms. These should be relieved by aspiration, and operation delayed.

Early diagnosis and prompt treatment of acute empyema will reduce to an irreducible minimum the condition known and feared as chronic empyema.

THE TRAUMATIC ABDOMEN

Rowland F. Webb, M.B., F.A.C.S.

Grand Rapids, Michigan

WHEN beginning as intern in a large industrial hospital, it occurred to me that many who were injured about the abdomen were lost that might otherwise have been saved by early exploratory and by doing whatever surgical procedure was indicated. There are many excuses, however, for conservative surgery because it is not always easy at the onset to convince one's self that a real injury has taken place within the abdomen.

The history and nature of the injury should be the governing factor at all times. The abdomen may have received a severe injury and great damage be done within the abdominal cavity, with little or no external evidence. To wait in these cases for the length of time taught by most writers, before intervening by exploratory laparotomy, will often make it too late to interfere at all. For example, a man is brought to the operating room injured in the abdomen by a piece of flying board thrown rapidly and with great force from a machine. There may be no evidence of abdominal injury either external or internal except a slight nausea and abdominal pain about the umbilicus. There may or may not be muscular rigidity. Shock may or may not be present, but on exploratory laparotomy visceral damage needing immediate repair is usually found.

The cases which have come under my observation may be divided into those which present evidence of external injury and those which do not present any external injury whatsoever. The former class may vary in degree from an abrasion of the skin to a complete rupture of the abdominal wall. The degree of the internal injury is not always dependent upon the degree of the external injury. In the latter type where no external wound or break in the skin occurs, the internal injury may be equally as severe, as in those injuries with the most extensive external wounds.

Report of Cases.

1. C. Man, age twenty, was struck in the abdomen by a board thrown from a rip-saw. Entered hospital one hour later with pain in the neighbourhood of the umbilicus, slight rectus rigidity, no nausea or vomiting. The signs did not seem to demand operation, but from the nature of the blow we thought best to open up, and a rent was found in the ileum about one inch in length, which was closed over, and the abdomen closed. The patient got well.

2. R. Man, age thirty, was struck by board in the abdomen. Entered the hospital two hours later. The abdomen was not rigid and the patient had not vomited. He had slight nausea while in the ambulance. The right rectus muscle became rigid ten hours later, at which time the pulse and temperature were normal. We opened the abdomen and found a ruptured ileum with the abdominal cavity filled with escaped intestinal contents. The bowel was repaired and abdomen closed, leaving drainage. Localized peritonitis developed but the patient recovered. This man should have been opened at the very beginning.

3. A. Man, age twenty-five, struck in the abdomen by a flying board from a rip-saw. There were no physical signs of injury when the patient was admitted to the hospital a few hours later. The morning of the second day the patient became distended and I was consulted by the attending surgeon and was loath to advise against opening up the patient, but was forced to do so because the peritonitis was too far advanced for even a local anæsthetic. Two hours later the patient was dead and post mortem showed a ruptured ileum. Had this patient been operated when first admitted, I believe a complete recovery would have been the result.

4. K. Man, age thirty-one. Patient fell beneath rear wheel of three ton truck which caught against the left side of the chest, sliding and pushing the patient along in front of the wheel for several feet without passing over the entire body. The patient entered the hospital one-

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half hour later. An examination revealed fracture at the anterior angle of the ninth and tenth ribs. The pulse and temperature were normal, but the patient had some abdominal pain, slight nausea, and stupor. We advised operation but the patient would not consent. Four hours later the picture had changed. There was now marked abdominal rigidity, more marked on the left, tenderness, rapid respiration, rapid feeble pulse, cold and clammy skin, with more stupor than at the beginning. The patient was finally persuaded to accept operation where upon opening the abdomen it was found filled tight with blood. A large extravasation of blood retroperitoneally was found to the left of the spinal column extending from the costal arch to the pelvis. The spleen was one large contused mass, with two lacerations on the medial surface, each three inches in length extending through half the thickness of the organ from which blood was pouring into the abdominal cavity. Splenectomy was done for the control of the hæmorrhage. Blood transfusion was done while closing up and the patient travelled along the way toward recovery until the seventh day, when pneumonia developed, and he died on the tenth day.

5. A. Man, age twenty-eight. Caught between two freight cars. Brought to the hospital immediately where an examination showed marked evidences of hæmorrhage but no external injury was present. The abdomen was opened at once. We found a complete severance of the ileum with lacerated mesentery and mesenteric vessels. The abdomen was cleaned of intestinal contents and an end-to-end anastomosis was rapidly done. The bleeding mesentery was controlled and the abdomen closed while a blood transfusion was done. The patient was put to bed showing signs of improvement from the profound shock and hæmorrhage, but fours later he suddenly became worse and died within two hours. Post mortem showed that a ruptured mesocolic vessel had been overlooked and had bled the patient to death. Whether there was a temporary clotting of this vessel which we overlooked, I am unable to say. If so, it evidently began bleeding again following the blood transfusion. One should, of course, make every effort to control every bleeding point as well as repair all damage to the viscera.

6. R. Age twelve years. Boy accidentally discharged his twenty-two calibre rifle into his left rectus muscle, just above the level of the umbilicus. At the end of the first hour there were no apparent signs of visceral injury. At the end of the second hour, nausea, pain, rigidity, and tenderness had developed with a sudden sharp increase in the rate of the pulse and respiration. The abdominal cavity was explored and ten perforations of the small gut were found. The perforations were repaired by suturing; in addition a resection of a few inches of the jejunum was necessary. The abdominal cavity was cleansed, drained and closed. The patient developed some localized infection about the drain but made a complete recovery. I mention this to show how innocent the picture may present itself one hour and how grave the following hour.

7. B. Boy, age seventeen. Shot by pistol through the right epigastrium in the forenoon. Entered the operating room three hours later, when I first saw him almost entirely exsanguinated from an apparent internal hæmorrhage. We were censured by the physician who referred the case for our proposal to operate, but we infused in this semi-comatose patient 500 c. c. of normal saline and opened the abdomen. The abdominal cavity was full of blood clots, the rapid removal of which revealed the bleeding point to be from a rent in the portal vein. This we stopped with three hæmostats grasping the edges of the rent. The abdomen was closed, leaving the hæmostat through a small unclosed part in the upper angle of the incision. Blood transfusion was done. On the fourth day the hæmostats were removed. The patient, made an uneventful recovery. I might add that the bullet pierced the lower edge of the right lobe of the liver near the round ligament The part of the liver below this wound sloughed a few days later.

SUMMARY

I have mentioned a few of the more important cases to show the success that may be attained if operation be done early, as well as the failures that will be certain to come, if not done early. If you wait for the symptoms of hæmorrhage and shock to appear, it is indeed too late, and since early interference offers the only hope for the patient in case of severe visceral injury there is to be no question when in doubt as to operation. No harm can be done to the patient by the ordinary exploratory of the abdominal cavity even if there be no internal injury; but in case such injury is found it offers the only hope for the patient's recovery.

Since we have taken this stand in regard to abdominal injuries we have encountered rupture of all the important abdominal viscera except the stomach. A total of twenty cases shows a rupture of the bowel in twelve cases, a rupture of the bladder in three cases, the liver in two cases, the kidney in two cases (each unilateral fortunately), and one case of rupture of the spleen. The ileum is the most common site of injury of the bowel.

The time of operation plays an important rôle in the prognosis as shown by our cases as follows: Nine cases operated within three hours after injury show an uneventful recovery except the one in which the bleeding mesocolic vessel was overlooked. Six cases operated after three hours following injury and before ten hours show only three recoveries with an equal number of deaths from hæmorrhage and peritonitis. Five cases operated ten hours after injury show recovery in but one case, that reported here.

May I again repeat with emphasis that there is no time to be lost in expectant treatment. No time to be lost in useless consultation; no time be lost in exploring. Open the abdomen if you believe there is the slightest chance of rupture of any of its viscera or vessels.

THE ACUTE ABDOMEN FOLLOWING ABDOMINAL OPERATION

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THERE is nothing more heart-breaking to the young surgeon or at times disconcerting to the matured one than to have something go wrong within an abdomen following an abdominal operation.

If, in briefly discussing the post-operative conditions of vomiting, abdominal pain, distention and shock, I class them as distinct entities, risking the charge of dogmatism, I do so only to emphasize the fact that by carefully making a systematic study of the condition present, one can arrive at a diagnosis that will lead to rational treatment.

There were surgeons of the old school, who, when called in consultation, could diagnose an acute abdominal condition as if by intuition. These were men who profited greatly from having seen many similar conditions, and who paid great attention to bedside diagnosis. Possibly in certain cases they failed to make a correct diagnosis, but they knew when to reopen an abdomen and when to leave well enough alone. To-day, thanks to hospital standardization with clinical records, reports of special examinations, and more particularly notes on the operation and the findings made at the time of the operation, we can, by careful perusal of these data, often formulate in our minds the possibilities of the case.

In addition to careful study of the history of the case, I wish to emphasize certain points that may be ætiological factors in the production of a given post-operative complication:

1. Was the operation performed for an acute or chronic abdominal condition? If acute, was there free pus present, and was there a rubber drainage tube or tubes used? I have seen a great deal of distention, and even vomiting result from leaving a rubber drainage tube too long within the abdomen pressing on a loop of small bowel. If chronic, then we must expect more or less abdominal trouble which is, however, unlikely to become dangerous.

2. Length of time taken at the operation. There is no doubt that, other things being equal, the shorter the operation the less likely we are to have trouble developing later.

3. Amount of anæsthetic? A long time taken to put the patient under, together with much anæsthetic, and air swallowing during the first stage, tends to produce stomach complications.

4. What was the operation done, and what difficulties arose?

5. How much traumatism was caused to the bowels and mesentery by clamps, manipulation, or pulling on the intestines through too small an abdominal opening? There is no doubt that by carefully handling the intestines, loosely applying

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clamps, and making a good sized opening, we can avoid much post-operative trouble.

6. Was there needless exposure of the intestines to chill or to iodine irritation?

Summing up then, was the technique all that could be desired?

In order to make a correct diagnosis of the post-operative condition, we must take into consideration some fundamental principles. The alimentary tract may be roughly divided into a secretory part, the mouth, stomach, and duodenum, into which is secreted about two pints of saliva and a similar amount from the other glands, and a lower portion, the colon, in which most of the water is abstracted from the intestinal contents. One can readily see then that a large quantity of fluid may be vomited without a marked dehydration of the patient taking place. Vomiting occurs earlier the higher the lesion is situated in the intestinal tract. Furthermore, speaking generally, sensations of pain can only be localized in those segments of the alimentory canal, which are more or less fixed, viz: stomach, duodenum, and colon, and the higher the lesion the greater the pain. The visceral peritoneum is more sensitive than the parietal, and even this sensitiveness differs in different people, and is greatly exaggerated in the neurotic. Certain people, as if the victims of an idiosyncrasy, form adhesions following an ordinary uncomplicated laparotomy; and, as the result of a slight infection of the peritoneum, one patient will develop septic peritonitis while another will straightway clear up. Finally, all abdominal operations produce more or less violent stimulation of the sympathetics, which in turn causes profound vascular disturbances within the abdomen.

Almost every abdominal operation is followed by some shock, some vomiting, more or less abdominal pain, and distention, a complex called by some writers, "Peritonism". I have seen vomiting continuing for two or three days called by the physician in attendance "anæsthetic vomiting", with little or no attempt to prove or disprove the assumption, or to alleviate the condition in any way.

These troublesome cases of vomiting and gas distention are too often relegated to the interns and nurse, and it is only when the symptoms of peritonism become more aggravated that the surgeon's attention is called to the fact and he then takes a renewed interest in the case. The patient, while not looking particularly ill, is nevertheless very uncomfortable, is vomiting more or less, is distended, and complains of colicky pains within the abdomen. High turpentine enemas, pituitrin, eserine, and strychnine, will usually relieve the patient and possibly save further complications. But should this treatment prove of no avail, the patient begins to look ill, is worried, and wonders why this vomiting is continuing. Although he has marked pain in the epigastrium, respiratory embarrassment and an feeling of distention, the vomiting has assumed the predominant feature of his post-operative condition. The vomitus seems to well up without effort, and is at first yellowish in colour, becoming dark brown or black from admixture of secretions with bile and blood. It fairly burns the mouth and lips of the patient and huge amounts are brought up. Removing then the tight abdominal binder or broad adhesive (which has added much to the discomfort of the patient), one sees a swelling over the stomach region which conforms to the capacity of the stomach, and one recognizes immediately an acutely dilated stomach, which should have been diagnosed a day or so sooner. This condition arises as a sequela to operation performed for gastroptosis and enteroptosis in the anæmic, neurotic women, who for long periods have taken cathartics, thereby producing atony of the stomach musculature. I have seen it following other abdominal operations, notably hysterectomies and the larger ovarian tumours.

The cause of this acute dilatation of the stomach which is a primary condition, seems somewhat obscure; but knowing the class of patient as those with atonic, or slowly emptying stomachs, highly neurotic and impressionable women, who may be ærophagics, we should be continually on our guard for this distressing post-operative condition.

Treatment. Reassure the patient beforehand, for fear of the operation has much to do with disturbing the rhythmic contraction of the stomach. If castor oil is given, it should be administered at least two days before the operation; an enema on the morning of the operation is sufficient. Avoid morphia as much as possible.

The actual treatment consists in:

(a) Early and repeated gastric lavage.

(b) The prone position.

(c) Normal saline by the bowels or subcutaneously.

Another set of circumstances. Having arrived at the third or fourth day following operation, and the signs of peritonism increasing, we find the patient anxious, the pulse increasing in rapidity and losing volume. Temperature may be normal, but the vomiting has increased, and, as it were, "slops over". Pain is marked above or around the umbilicus, especially if localized peritonitis exists. But in this case we do not find the characteristic swelling of the acutely dilated stomach. There is almost complete constipation and inability to pass gas, notwithstanding the nurse's report that some small amount of fæces and gas were passed, we must come to the conclusion that we are dealing with paralytic ileus. The diagnosis of this condition from mechanical ileus is often difficult, for those conditions which cause the former may also cause the latter. However, in mechanical ileus, the toxæmia is not so marked and is slower in onset. The abdominal pain is at first colicky, becoming localized as peritonitis supervenes. Excepting in the very thin, one must not expect to see the ladder-like arrangement of the coils of small intestine as seen in chronic obstruction of the bowels.

This condition is a desperate one and we must recognize it early; by this, I mean, before the patient has taken on the markedly toxæmic look when all treatment fails. In passing I refer you to the work of Whipple, Stone and Bernheim, and of Draper, who have made such exhaustive studies upon toxic agents present in the duodenum which are, together with the great dehydration of the patient, responsible for his death.

There is a time when it is essential to make the diagnosis between these two conditions, for the one may reasonably be treated for some hours medically, while the other must be treated surgically. If it is paralytic ileus, and the general condition of the patient is fair, collapse not too marked, pulse not over 80 or 90, and the distention not so severe as to lead one to suppose that the bowels are beyond stimulation, then one is justified in continuing gastric lavage, high enemas, pituitrin, eserine and strychnine. If mechanical, then one must reopen the abdomen and relieve the obstruction, be it adhesions, bands, or the like, not forgetting that there is a certain amount of toxæmia from the upper bowels that must be eliminated. This stage having passed, then the immediate treatment is the same in both, namely, enterostomy. This is performed under local anæsthetic, the jejunum is opened as high as possible, leaving the mechanical obstruction for a later date. It is useless to do more, the bowel wall has already lost its power of keeping back bacteria and the peritoneal cavity is infected; any further manipulation takes away what little chance the patient may have.

Here I wish to refer to a condition of paralytic ileus, differing little from the foregoing but usually showing more distention in the flanks, and in which the colon as well as the ileum is involved. This condition has been ably described by Handley, and is called by him "ileus duplex". Since the publication of his paper, I have taken pains to note the position of the small bowel, that he describes as hanging over the brim of the pelvis, and I have called my assistant's attention to this loop on several occasions. This condition may develop following infection of the pelvis, due to an acute ruptured appendix or pus tube and ovary.

These forms of ileus may give some difficulty in diagnosis from general septic peritonitis, but the careful perusal of the history of the case, the searching study of the face, and behaviour of the patient, together with the trained hand upon the abdomen, and a polynuclear blood count, should keep you right. To the trained diagnostician there is a subtle difference (fineness of distinction) in the look of the face and in the constitutional symptoms of a patient who is dying from a toxæmia or chemical poison produced within the duodenum or bowel, from that produced by septic infection in the general peritoneal cavity or without the bowel. The marked tympanites and abundant exudate seen in septic peritonitis limits the inflammatory process and lessons absorption. In brief, the treatment of septic peritonitis is absolute rest for the bowels and for your patient generally, by giving morphia, gastric lavage, rectal tube, inserted at intervals, hot turpentine stupes to the abdomen; and sustain your patient by judicious stimulation and normal saline by the bowels. Salines, no matter how given, produce better results in general peritonitis than in acute dilatation of the stomach or paralytic ileus.

Finally, there are those cases in which possibly the peritonism, following gall bladder operations or duodenal ulcers, has not been so marked as in the preceding, but the patient is seized with intense pain around the umbilicus or just above it, vomiting becomes worse, and intense collapse supervenes, with marked signs of intestinal obstruction. We diagnose acute pancreatitis or thrombosis of the mesenteric vessels. The condition is so grave that, having waited for the initial shock to pass off, an exploratory laparotomy is justified, and reveals, in the former, a bloody fluid within the abdomen, fat necrosis, an enlarged pancreas with necrotic areas, and in the latter an extent of dark, lifeless bowel. Finding acute pancreatitis, drain the gland freely by means of cigarette drains passed through the gastro-colic omentum; if thrombosis, the case is hopeless and nothing remains but to close the abdomen.

In conclusion, I ask each operator to consider it a serious matter to open an abdomen. Having done so, the case demands the very best post-operative treatment by the attending surgeon, for it is often the unexpected that happens. We can lessen the high mortality in these conditions only by the early recognition that our patient is not doing well and that something is going wrong within the abdomen, not by leaving the patient until marked distention and pain make the diagnosis of these complications well nigh impossible.

THE TREATMENT OF DIFFUSE SUPPURATIVE PERITONITIS

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THE problem presented by the treatment of diffuse suppurative peritonitis—that condition in which we find free pus in the peritoneal cavity—is one which never loses its interest. Unfortunately it is one of those conditions which, from one cause or another, is for ever forcing itself upon our attention. Notwithstanding the fact that much has been accomplished in the last quarter of a century in the way of improving our methods of dealing with this condition, it is a regrettable fact that every year great numbers of people succumb to its ravages.

It is safe to say that for many years to come the aggregate number of deaths from this condition will continue to constitute a considerable percentage of the annual number of deaths from all causes throughout Canada. It is, I trust, not too much to hope, that with increased enlightenment of the population, lay and medical, with regard to acute abdominal conditions, the present mortality will become greatly reduced. Modern medicine and surgery in every department accord a high place to preventative measures. No study of diffuse suppurative peritonitis can be complete without a consideration of preventative as well as curative measures. The subject of peritonitis is so broad, and the causes so various, moreover the stage of the process reached in individual patients when they appear for treatment, differs so widely that it is manifestly impossible to discuss in the course of a short paper all problems which arise. It will be admitted by everyone that the first logical requirement in the treatment is the removal of the cause. The question may arise on first seeing a case as to whether the attempt to do this should be immediately carried out or whether operation should be delayed for a time to permit nature to localize the infection. Undoubtedly most cases require immediate interference.

There are, however, other cases seen during the period when the individual is suffering from the initial shock produced by the sudden infection, when the wisest course is to postpone operation for a short time.

The judicious selection of these cases is so much a matter of judgment on the part of the surgeon, that it would seem that a purely academic discussion of the points on which a decision is based, would be a waste of time here. At the outset it must be recognized that time is a most important element in deciding the prognosis, that is to say—cases seen early and operated on early, often give most brilliant results in the hands of different men using very diverse methods of post-operative treatment. It is equally true that cases encountered late, when the suppuration is widespread and the toxines have produced marked vaso-motor disturbance, do very badly under any form of treatment.

There are, however, certain fundamental principles which apply with equal force to all these cases no matter in what stage of development they are met.

The anatomical arrangement of the peritoneum is of such a nature that, partially enveloping as it does, muscular hollow structures, a given area of it is liable to be pushed about from place to place by the muscular activity of the hollow viscus which it covers. This of itself complicates the problem of giving it rest and, as it were, places it at the mercy of the structure to which it is attached.

Moreover, such an area of peritoneum, subject to suppurative inflammation, becomes a menace to the healthy adjacent or even distant parts of the peritoneal cavity by reason of the vermicular action of the enclosed intestine tending to push it about, and infect all that it touches.

Since the examination of the gastrointestinal tract in chronic affections, by means of the *x*-ray screen, has been so frequently resorted to we have come to realize what comparatively slight stimuli are necessary to set in motion this peristalic activity. Even a small amount of water with an inert opaque substance in suspension, if taken into the stomach while the abdomen is being observed, can be seen to be projected rapidly into the small intestine when it is very rapidly passed along by the contractions of the muscular coats of the bowel.

Bearing in mind constantly the peculiar anatomical relationship of the peritoneum as an investing covering of the intestine, we can better realize the cause of the development of diffuse suppurative peritonitis. Further, we can better understand the cause of the development of the varied manifestations which result when the peritoneum becomes attacked by acute inflammation. In inflammation even of a simple character which never goes on to suppuration, we find exudation of inflammatory products. In the case of the peritoneum, part of this takes place into the peritoneal cavity in the form of free fluid, but just as surely some takes place in the other direction into the connective tissue spaces of the intestinal wall. This even by its mechanical action interferes with the muscular power of the intestinal walls with the result, that that particular portion of intestine no longer by the contraction of its muscular coats forces its contents downward. Although in effect this amounts to a partial obstruction, it is nature's method of putting the part at rest. This rest, if not interfered with by meddling, permits coils of intestine and omentum to become adherent one to another so as to close off the inflamed area from the undamaged peritoneum.

Furthermore this paresis may result in a backward flow of the bowel contents into the stomach from which it is expelled by vomiting. This phenomenon should be a clear and unmistakable announcement from nature that the intestinal tract is closed for repairs and that no new business is to be received until repairs are completed.

How often, however, is this sign misinterpreted or ignored and an effort made to force the contents of the intestine downward by purgatives. The net result of this interference is, that nature's efforts to place the inflamed peritoneum at rest is overcome and the inflamed surfaces are pushed away from each other so that the formation of a barrier of adhesions cannot be accomplished.

Let us briefly review the train of events which lead up to the development of a diffuse suppurative peritonitis resulting from one of the most common causes,—the rupture of an acutely inflamed appendix. If the adjacent intestines are not in a state of active peristalsis the process just referred to will take place and the infected contents which have just leaked into the peritoneal cavity will cause a protecting inflammation of the peritoneal covering of the intestine with which it comes in contact, resulting in the adhesion of intestinal coils one to another. At the same time their muscular walls are held in a condition of comparative inactivity by the mechanical action of the exudation and perhaps its chemical action on nerve endings. If, on the other hand, the intestines were at the time of rupture in a state of peristalic activity the infective material would be carried widely through the abdomen. The widespread inflammation thus induced produces free liquid pus in the cavity. Here and there where the intestine is quiet are formed areas of plastic lymph when nature is endeavouring to cause the intestines to adhere and wall off the spreading tide of pus.

The absorption of toxic products from the peritoneum and from the stagnant material within the intestine brings about a vaso-motor paresis resulting in the cyanosis of the extremities. The dilation of the peripheral vessels together with diminution of the fluids in the blood vessels gives the heart less to contract upon. To cope with this, the heart acts more rapidly, as evidenced by the small rapid pulse. All this time the patient is further depressed and shocked by the inevitable associated pain. This constitutes a rough outline of the pathological processes developing in a spreading purulent infection of the peritoneum.

In the active treatment of a diffuse suppurative peritonitis it follows then that we have to cope with a number of conditions all arising primarily from some focus whether it be a necrotic appendix, a ruptured hollow viscus or what not. These are: The intestinal paresis and resulting distension; the presence of free pus in the abdomen; the general toxæmia and the circulatory disturbance associated with it, and always to a varying degree, pain. It is, we may assume, universally admitted that the first essential in treatment is the removal or segregation of the primary focus whether that necessitates the removal of a diseased appendix, ruptured gall bladder or the closure of a perforation in a hollow viscus. The technique of these procedures has been so thoroughly discussed in various works on abdominal surgery that we need not to-day do more than refer briefly to a few important considerations. The operative work, whatever is required, should be carried out with all possible rapidity but at the same time with the utmost gentleness, so as not to inflict further trauma on already inflamed structures. Much of the free pus can be removed while the actual work of removal or repair of the causative factor is in progress. This is most easily accomplished by use of the suction pump, without inflicting the injury which sponging causes.

Tube drainage should be inserted, one tube of large calibre down to the floor of the pelvis and another to the site of the primary cause, and these brought to the surface through either the operation wound or other stab wounds. The wound is then closed. If the tubes have egress through it, care should be taken not to close the wound too tightly around the tubes. A suitable absorbent dressing should then be applied. It is the writer's conviction that in a very large proportion of these cases of diffuse suppuration in the peritoneum that the battle has only begun when the operation has been finished and that the fate of the patient is determined quite as much by the form of post-operative treatment to which he is subjected as by the skill with which the operation is performed.

Certain fundamental principles have been laid down for the treatment of peritoneal inflammation, notably by Fowler, Ochsner, Murphy and Crile, and while in a general way these principles are accepted by the majority of surgeons, it would seem that they are not always carried out to their logical conclusion.

In the pre-operative care of a case of localized peritonitis accompanying an acute appendicitis, for instance, no surgeon of the present day would dream of using active measures to overcome the distension of the coils of intestine which, adhering together wall off the infection from spreading through the peritoneum. He recognizes that absolute rest is essential.

The paresis of these limited lengths of small intestine, produced largely by inflammatory exudation into their walls, is nature's method of overcoming the activity of these portions of the gut and so preventing them from spreading the infective material on their peritoneal surfaces to distant parts of the abdominal cavity. In the paresis and resulting distension of greater lengths of small intestine in the diffuse type, is not nature still endeavouring to place the peritoneum at rest? In the diffuse type of suppurative inflammation of the peritoneum when the operation is successfully completed we are still confronted with the problem of aiding nature to overcome inflammation, and localize the pus which, despite our greatest care and effort, we cannot wholly remove. How then are we to accomplish this? The first essential is to put the inflamed part at rest. Obviously, so long as any factor which causes peristalsis comes into play this cannot be done.

We have learned, as has previously been referred to, that the presence of any material in the stomach tends to produce peristalsis. Clearly then the first indication is, to empty the stomach by lavage with warm water before the patient leaves the table.

Following that, it is equally essential that nothing, not even a drop of water, be allowed to get into the stomach until sufficient time has elapsed for firm adhesions to form around collections of pus which may remain in the abdomen and safely encapsulate them.

An additional measure at our disposal to control peristalsis, which has been emphasized by Waugh, of London, and Crile, of Cleveland, is the administration of morphine. This should be given, not in trepidation, but freely enough to keep pain constantly under control. In this connection it is held by some that morphine is objectionable, inasmuch as it favours further paresis of the muscular coats of the intestine and so produces greater distension. This objection is not upheld by the experiences of those who have used morphine freely in this condition. Experience has shown that if the intestine is kept at rest by the measures indicated the inflammation subsides, thickening in the intestinal wall is absorbed and the normal functions of the muscular coats of the intestine is resumed.

Then in spite of the supposedly paralyzing effect of the opium the patient expels flatus spontaneously, without any additional stimulant to peristalsis. The administration of opium exerts a twofold beneficial effect. It tends to lessen peristalsis, aiding in keeping the part at rest, and, as Crile points out, by preventing painful impulses from the peritoneum reaching the central nervous system, minimizes shock. While the advocates of the free use of morphine may not be prepared to go so far as Crile and give sufficient doses, repeated frequently enough to keep the respirations down to twelve or fourteen to the minute, many surgeons are agreed on its great value given in doses sufficient to keep pain constantly overcome. One has to recognize that there are a certain number of patients who appear to have an idiocyncrasy for morphine. When it causes respiratory difficulty or markedly increases cyanosis it must be discontinued.

If the intestine is to be kept at rest by permitting absolutely nothing to be put into the stomach, the problem of supplying food and water has to be solved.

So far as food is concerned, this may be disregarded. In the average case even if the individual be poorly nourished, the cutting off of the food supply for a number of days does not cause serious disturbance, provided that abundance of water can be introduced into the system. It is absolutely necessary, however, to provide water, for three reasons. Firstly, to wash out the toxines; secondly, to fill the blood vessels and so give the heart something to contract against, otherwise the increasedly rapid contractions of the heart, to keep the diminished contents of the vessels in circulation will wear it out; and, thirdly, to assuage the intolerable thirst.

The introduction of water in sufficient quantities can usually be accomplished by the instillation of plain water, salt solution, or soda solution, into the rectum. It may be desirable to add to the soda solution glucose in sufficient quantity to make a 5 per cent. solution. This it is claimed lessens the tendency to the acid intoxication which tends to develop in cases which are subjected to starvation and supplies a small amount of carbohydrate nourishment. Mead's maltodextrose may be used in preference to glucose, as it is apparently non-irritating. Some samples of glucose have been found to be intensely irritating. Occasionally water or saline solution given by the drop method will be found to be badly tolerated. In some cases the substitution of slow injections of 10 to 15 ounces of water or soda solution every four hours is better borne. In cases where neither can be tolerated, saline solution can be introduced subcutaneously. In some cases the intolerance of the rectum to the instillation of water drop by drop is undoubtedly due to the accumulation in the rectum of fæcal matter.

The gentle irrigation of the rectum with normal saline solution by means of a large rectal tube and funnel once or twice a day will frequently overcome the difficulty. This ought not to be administered as an enema because it may have the effect of producing rather active peristalsis. It should rather consist in permitting a very small amount of fluid to run into the bowel and then immediately draining it away through the tube. This process is to be repeated until the solution returns free from fæcal masses. The administration of so-called *nutrient enemata* in these cases is of very doubtful utility, as it is apt to leave in the bowel a putrescent residue of unabsorbed material. This causes irritation of the rectal mucous membrane and renders difficult the administration of the necessary amount of water. In an acute condition, such as that we are dealing with, the patient's fate is decided, as a rule, in a few days. When so much depends on the absorption of sufficient water, it seems hardly worth while to take any chances with a measure of such doubtful utility as the nutrient enema.

Posture in this, as in inflammatory conditions elsewhere, is worthy of great consideration. The placing of the patient in a sitting position according to the method of Fowler, favours the gravitation of pus into the pelvis, where absorption is less active, and from which exit has been provided by the drainage tube. The patient, moreover, is usually more comfortable and respiration is easier. The modern Fowler bed makes the maintenance of the partially sitting position fairly easy. This, however, ought not to satisfy the attending surgeon. Not infrequently one finds that the patient is allowed to sag down so that, the buttocks resting on one incline and the shoulders on the other, the patient's spine presents a curve with convexity downward. Obviously the patient is worse off in this position than he would be if placed on an ordinary mattress. This is mentioned only as a detail, which requires constant supervision.

Admitting the correctness of the theory of establishing physiological rest by the treatment outlined, the question arises, how long should it be kept up? In a general way it should be persisted in until there is evidence that the acute inflammation has subsided, and that any purulent collections which have failed to drain away are, firmly encapsulated. This is shown by the improvement in the patient's general condition lowering of pulse rate, cleaning of the tongue, lessening of the distension, disappearance of pain and spontaneous expulsion of flatus. How many days it will require in a given case to reach this degree of improvement, will naturally depend on many different factors. The virulence of the infection, the extent of the diffusion of the pus and the patient's reparative powers, will all have some influence in determining how many days' rest will have to be enforced. In some cases with good vitality, and a moderate diffusion of the pus, a few days will suffice. In other cases, where the infection is more wide-spread and reparative activity is slow, as much as six or seven days may be needed. In any event the use of stimulants of intestinal peristalsis, whether in the form of purgatives, irritating enemata, or hypodermic injections, has no place in the treatment of acute suppurative peritonitis either before or after operation. The distressing distention of the abdomen which is so often present in these cases on the second or third day after operation seems to be a temptation to use measures to stimulate peristalsis, and so cause the distending gases to be expelled. If this temptation is yielded to, and movement of the bowels produced, it is apt to be at the cost of bringing about a wider diffusion of the infective material, and injury rather than benefit results to the patient. The safest treatment of distension lies in preventing anything from being put into the stomach and the occasional insertion of the rectal tube each day. To summarize the treatment in brief, it consists of: 1. Early removal of the cause by operation. 2. Provision for the escape of pus by suitably placed drainage tubes. 3. Posture to favour the gravitation of pus into the pelvis, *keeping the intestines at rest as far as can possibly be done* by means of interdicting all food and water by mouth and the free use of morphine to lessen peristalsis and control pain. 4. Lessening of shock by cutting off painful stimuli by means of morphine. 5. Introduction of water into the system by rectum to flush kidneys and carry away toxines. 6. Avoidance of purgation at every stage of the disease. While it is essential to prevent even water reaching the stomach, it is permissable and desirable that the patient should be at liberty to rinse the mouth as frequently as desired. For this purpose water, either plain or flavoured with fruit juices can be used. Permitting the patient to chew gum helps to keep the saliva flowing and renders them more comfortable.

In so recently published a reference work as the "Oxford Loose Leaf Surgery," on page 847, under the heading of "Treatment of Diffuse Suppurative Peritonitis, After Treatment." *Feeding:* Should vomiting persist feeding by the mouth is useless; in any case nothing but sips of warm water only are to be allowed during the first twelve hours. Later it is best to commence with albumen water, whey, or milk and soda water. To these may be added some of the various patent foods and meat extracts after the first twenty-four hours. Thirst in the early stages is best met by infusion of normal saline per rectum."

It may seem presumptuous to criticize the teaching of so distinguished an authority as the author of the above. The writer of this paper contends that such treatment will often be sufficient to turn the scale unfavourably. Whether the case be apparently mild or apparently hopeless it would seem that it is advisable to secure physiological rest for at the very least forty-eight hours, and this cannot be accomplished if sips of water or broth and other liquid food be given. I am aware that the points which have been brought forward for your consideration in this paper may seem to many of you to be trite. It may be said, and truthfully said, that nothing new has been presented. Can you not recall a circumstance somewhat like this? One is asked to see a case of diffuse peritonitis, which was operated on perhaps three days ago. The attending practitioner informs one that drainage was going on well and the patient was in very fair condition. There was, however, a good deal of distension. He decided that the bowels ought to be moved, and for that purpose had given calomel, magnesium sulphate, perhaps hypodermics of eserine or pitrutrin, and was much gratified when at last a good evacuation of the bowels was secured accompanied by free expulsion of flatus.

The patient, however, had seemed to go to pieces soon after; the pulse became rapid and thready and he manifested symptoms of profound shock. The doctor had lost sight of the basic principle in the treatment of inflammation, the maintenance of physiological rest. By his treatment he had moved about inflamed peritoneal surfaces and torn down the adhesions which nature was building. This is my apology, if any be needed, for presenting this paper.

Some reference was made at the beginning of the paper to preventative treatment. In looking back over our cases of diffuse peritonitis secondary to acute appendicitis, most of us will agree that by far the largest number of these had been given a purgative. It may have been taken by the patient himself or administered by kind and well-meaning friends. The average lay citizen has an abiding faith in the efficacy of a purgative as a cure for belly ache. Pick up any newspaper or periodical, whether it be the weekly paper of the country village or one of the daily papers of a large city, you will find in it advertisements of purgative nostrums which claim to cure cramps, colic, and disturbances of the digestive organs. A few of them even specify appendicitis and gall stones as coming especially within their field. How often have you seen an article calling the attention of the people to the danger of taking a purgative in the hope of relieving an acute addominal pain? What measures have ever been taken to educate the laity in regard to the great danger to life that lies in the administration of purgatives in the presence of acute appendicitis? Can we wonder then that they resort so readily to the only means which seems to be at hand, especially when such measures are forced upon their attention daily? How then is this to be combatted? In all matters pertaining to health and prevention of disease the great mass of the intelligent public look to the medical profession for guidance. It is our duty individually and collectively to aid them in these matters.

Surely the time has arrived when the medical professon of Canada can take steps to carry on a propaganda of education through the lay press, not only in regard to this point, but many others of equal importance. No one would claim that educating the public to avoid purgatives as a treatment for acute abdominal pain will prevent the occurrence of diffuse suppurative peritonitis. Most surgeons will agree, however, that if this could be accomplished, many cases of this distressing condition which go to a fatal termination, would never have developed. They would, on the other hand, have presented themselves for surgical treatment at a time when comparatively simple measures would have sufficed to produce a cure.

It has been decided at a meeting of friends and former colleagues of the late Colonel Sir Victor Horsely, to take steps to commemorate his services to Science and the Empire, by the foundation of a Lectureship or Scholarship bearing his name.

Sir Victor Horsely was one of the most noteworthy students of University College Hospital, a very distinguished medallist and graduate of the University of London. and a leader and first Chairman of the Representative Meeting of the British Medical Association. He was a Fellow of the Royal Society, and a pioneer in research work connected with the causation of myxœdema. His investigations on the value of the Pasteur method of treating rabies, were of the utmost value as proving the possibility of stamping out rabies in Great Britian.

Over and above his great achievements in Science and in Surgery, he will ever be remembered for his unselfish enthusiasm for the social betterment of his fellows, and he leaves us the memory of a unique character whose brilliance shed its lustre on his profession and his life-work.

DIVERTICULITIS OF THE LARGE BOWEL

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DIVERTICULA of the large bowel, congenital or acquired, are undoubtedly much more common than the average clinician, surgeon, or pathologist realizes. All congenital pouches are true diverticula, their walls being composed of the structures of the bowel wall at their point of origin. Acquired diverticula may be either true or false. The false diverticulum has no muscular coat, or at least a very imperfect one; it is this type in which we are most interested.

False diverticula vary in shape from straight tubular canals to flask-shaped pouches with narrow necks, connected with the lumen of the bowel, and are from about 0.5 cm. to about 3 cm. in diameter. They are frequently spoken of as mucosal hernias, since they are the result of a protrusion of the mucous membrane through openings in the muscular wall. They are covered by serosa with a varying amount of submucosa intervening. On account of their narrow necks and the fact that they occur in a part of the bowel in which the contents are semi-solid, they are usually distended with fecal matter which becomes inspissated and acts as a mechanical irritant to the mucous membrane. Ulceration results and the infection extending through the mucous membrane causes a variety of sequelæ.

The clinical diagnosis and the surgical treatment of diverticula of the large bowel have been among the marked advances in medical science during the last fifteen years. True to professional traditions, however, they have hardly reached the important place in medical literature that they deserve; in fact, few text books give an intelligent description of the various phases of intestinal diverticula.

Virchow, in 1853, in describing "isolated circumscribed adhesive peritonitis of the colon", no doubt referred to diverticulitis of the large bowel, and Fisher's case of an inflammatory communication between the sigmoid and bladder, reported in 1858, probably was diverticulitis. It was not until 1898, however, when Graser demonstrated the presence of diverticula in conjunction with the inflammatory process that the entity of the disease was established. Following this several observers noted and described the condition. The first complete article in the English language was published by Beer in 1904. In 1907, Mayo, Wilson, and Giffin reported in detail with pathologic findings five cases in which the colon was resected, and referred to several others in which there is little doubt that diverticulitis existed. In three of these operation was performed for vesicosigmoidal fistula of inflammatory origin, and several other cases with the same ætiology had no doubt been treated at the Clinic for left-sided abdominal abscesses or fistulæ.

Since the publication of this paper many short papers on the subject with reports of one or two cases and a review of the literature have appeared. Excellent articles on different phases of the subject have been published in recent years by Moynihan, Bruce, McGrath, Mayo, Carman, Giffin, Telling, Erdmann, and others.

Certain phases of diverticulitis of the large bowel are often confused with malignancy, and there is little doubt that some of the so-called cures that are claimed even at the present time for extensive cancer of the large bowel are cures following operations for diverticulitis, and if careful microscopic examinations were made of all such specimens the frequency of the occurrence of the condition would be more thoroughly realized.

The similarity of cancer and diverticulitis of the large bowel is suggested by the title of Moynihan's first paper on the subject, published in 1907, "The mimicry of malignant disease in the large intestine." The macroscopic appearance of proliferative extramucosal inflammatory masses and carcinoma are very similar in many cases; a microscopic examination of the tissue is often necessary in order to make a correct diagnosis.

Telling, in 1908, collected one hundred and five cases from the literature; in twenty-seven operation had been done, and in eleven the condition was thought to be malignant at the time of operation.

Presented before the Ontario Medical Association, Toronto, May, 1920.

The other diverticula were found at necropsy or on re-examination of museum specimens originally considered malignant.

From January 1st, 1904, to May 1st, 1920, two hundred and fifteen cases in the Mayo Clinic were diagnosed diverticulitis. In one hundred and thirty-six cases the diagnosis was made clinically from symptoms and rœntgen-ray findings. In ten of these carcinoma was also diagnosed. Twenty-seven of the remaining ninety-nine cases were diagnosed carcinoma, and in fourteen of these both conditions were found. In most of the other cases operation was done for some other condition and the diverticula were found accidentally. Beside the cases considered in this paper, seventy-three appendices were removed which were found to have diverticula in their walls.

Diverticula of the acquired type may be found throughout the entire length of the large bowel. The condition occurred in the sigmoid in ninety-three of the one hundred and twelve patients operated on, in the rectum in seven, in the cæcum in six, in the descending colon in four, and in the transverse colon in two. In some of the cases in which the diverticulum was listed as being in the sigmoid a few diverticula were also present in the descending colon. In a few instances they were distributed along several feet of the colon.

As a rule diverticula of the large bowel are multiple; occasionally they are associated with diverticula in other viscera. In a case reported by Hansmann, there were more than four hundred in the intestinal tract. In the cases most frequently noted by surgeons the disease is limited to a comparatively small part of the large bowel, particularly the sigmoid and descending colon, which usually have from five to ten discrete diverticula.

Constipation is marked in most cases of diverticulitis. Men are affected almost twice as often as women. In spite of the fact that Erdmann and others have reported cases in childhood, the disease belongs essentially to middle life and old age. In children the diverticula are probably congenital and apt to be associated with other congenital anomalies. None of the patients operated on were in the first or second decades, only five were in the third, thirteen were in the fourth, thirty in the fifth, thirty-nine in the sixth, and twenty-five in the seventh and eighth.

Ætiology. No single factor furnishes a sufficient explanation of the origin of all acquired diverticula. Weakening of the wall of the bowel, and increased pressure from any cause, from within its lumen, especially in the distal half of the colon where fecal matter is stored for intermittent elimination and is more solid than that in the upper bowel, are probably the most constant clinical findings. This is especially true if the predisposing causes are of long standing. The term "mucosal hernias" indicates that the same mechanical and nutritional factors that predispose to hernia in other parts of the body are to be considered. It is a striking fact that most of the patients appear healthy, and very few give a history of losing weight, and except when there is a superimposed malignancy there is no evidence of cachexia. In our cases the average weight was one hundred and fifty-six pounds; the heaviest patient weighed two hundred and twenty-seven pounds, the lightest one hundred and twelve pounds. In a few cases there was a definite history of obesity with some loss of weight during the last few months. The normal structure of the large bowel with its irregular arrangement of longitudinal muscular bands and multiple sacculations, together with the presence of a considerable amount of subserous fat accompanying relatively large perforating blood vessels in which the blood pressure varies considerably, must at least be considered a predisposing cause.

Diverticula may possibly be found at any point on the circumference of the large bowel, but the greater number are on the sides between the mesocolic and lateral muscular bands. They gradually increase in size and naturally grow in the way of least resistance toward the mesentery or into the bases of the appendices epiploicæ. Their necks, or points where the mucous membrane pierces the muscular wall, are, in most cases at least, at points where the blood vessels also pierce the muscular coat. Some of the early writers considered the mesenteric attachment the most frequent seat of the disease, but pathologists now are agreed that diverticula seldom, if ever, originate at this point, because the bowel wall is exceptionally strong at the site of the mesenteric attachment. In a diagram of the large bowel (Fig. 1) the weak point is shown well up on the sides of the viscus where the blood vessels penetrate the circular muscle.

The mesocolic band is perforated only by relatively small blood vessels which can be the cause of very little predisposing tendency to the development of a hernia at this point. Drummond compares the relation of the blood vessels to the development of intestinal diverticula with the relation of the spermatic cord to the development of inguinal hernia.

The pathologic anatomy varies greatly, according to the location and amount of inflammatory reaction. Undoubtedly in many cases there is little evidence of peridiverticulitis and the diverticula stand out freely from the bowel wall, very often in the interior of the appendices epiploicæ. In other cases there is a chronic mesenteritis as the result of a diverticulum which follows the course of the blood vessels and by extension of infection from the interior to the mesenteric fat results in abscess formation or an inflammatory mass. In still other cases an acute perforation may occur with the typical finding of a general or a localized peritonitis, and in some cases obstruction results from direct pressure of an inflammatory mass on the bowel (Fig. 2). Occasionally, beside the inflammatory changes, carcinomas may also develop in the bowel wall.

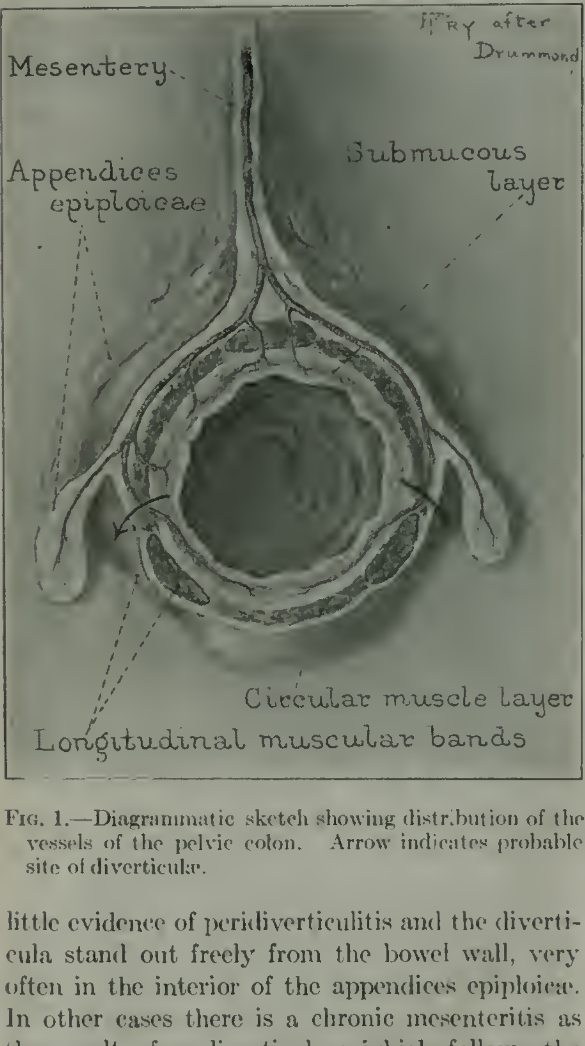

Fig. 1.—Diagrammatic sketch showing distribution of the vessels of the pelvic colon. Arrow indicates probable site of diverticulæ.

The symptomatology of diverticulitis of the large bowel is analogous in many ways to the symptomatology of appendicitis, except that the location is less constant. With both diseases, chronic, subacute, and acute manifestations may develop and the possible sequelæ of abscess formation, fistulæ, localized peritonitis, diffuse peritonitis, obstruction from adhesions or pressure, and malignant changes. Wilson has shown that the symptoms are seldom those of diverticulitis, but more often of a peridiverticulitis.

In many so-called chronic cases one diverticulum causes all the trouble, in other cases one diverticulum after another becomes inflamed, keeping up more or less constant trouble, and the localizing symptoms change according to the position of the inflammatory process. If perforation occurs the symptoms except for location are identical with those with a perforated appendix.

In the differential diagnosis of the acute type of the disease all conditions that tend to produce the so-called acute abdomen have to be considered. In the majority of cases, however, the trouble is in the sigmoid or rectum and the possibility of a left-sided appendix, of luetic and tuberculous conditions, and, in women, of pelvic inflammatory conditions must be ruled out.

The most common type of diverticulitis of the large bowel observed in the Clinic is the chronic, with subacute exacerbations from time to time as a result of extension of infection to the peritoneal surface. During an attack a mass can be felt through the abdominal wall in many cases, and it is the presence or the contraction of a tumor mass that produces the narrowing, and in some cases stricture of the bowel, without any visible change in the mucosa of the lumen of the gut itself.

The clinical diagnosis made in the majority of these cases is carcinoma with infection; a view of the external surface of the growth and palpation frequently tend to confirm this suspicion, and the filling defect shown on rœntgen examination is identical in the two conditions. Not until the

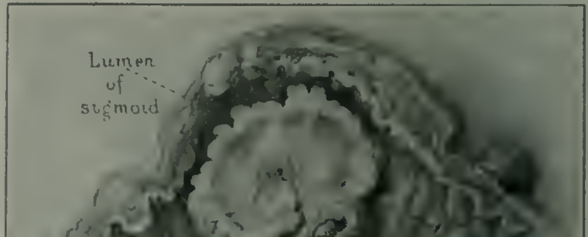

Fig. 2. (Case A84962). Diverticulitis of the sigmoid. Inflammatory mass causing obstruction.

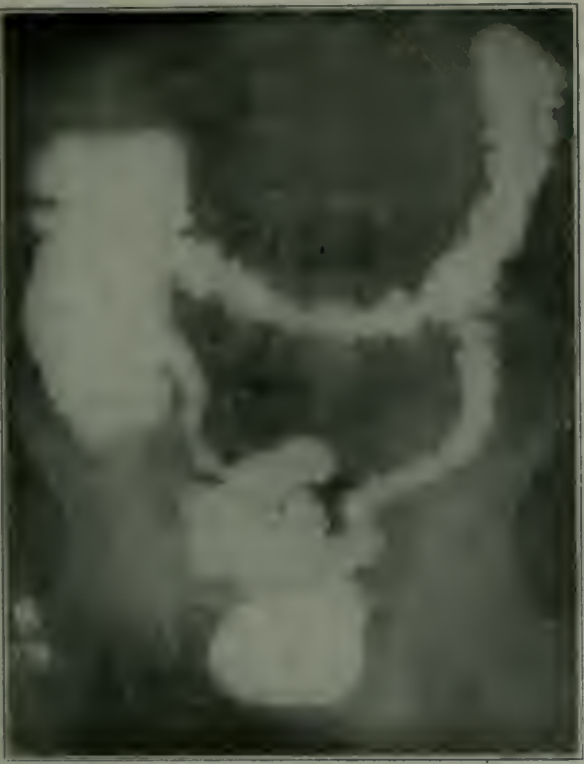

FIG. 3.—Extensive diverticulitis of the large bowel.

bowel is resected and thoroughly examined is the truth known.

Sometimes abscesses develop as the result of diverticulitis. In some cases they are within the leaves of the mesentery and cause obstruction by pressure or angulation of the bowel. In other cases they rupture into the bowel or into some other viscus, especially the bladder. Vesicosigmoidal fistulæ occurred in five of our cases. Since malignancy is the only other condition responsible for such fistulæ a cystoscopic examination as a rule clears the diagnosis.

In a very interesting group of cases of intestinal disease the history of several years is typical for diverticulitis; the loss of weight and strength is rapid during the later months. The hemoglobin is lowered and blood and mucus appear in the stool. Rœntgen examination in many cases shows multiple typical shadows of diverticula and a definite filling defect. Proctoscopic examination by which malignancy in all relatively low-lying growths may be recognized is not of much value in the diagnosis of diverticulitis, since the internal openings are rarely seen in such examinations (Figs. 3, 4, and 5).

A point of diagnostic value is the age of the patient, who is usually more than thirty, more often a man than a woman. His general condition is good as a rule, with little loss in weight. Most patients are very much constipated, although diarrhœa is occasionally met with. The severe abdominal pain comes at irregular intervals. If the peridiverticulitis is marked a mass may be felt during attacks which disappears between attacks. In all cases in which doubt exists a thorough rœntgenologic examination (both plates and screen) should be made; the characteristic round or oval-shaped shadows of barium outside the lumen of the bowel are proof positive of the condition in the majority of cases. Carman has suggested that in order to rule out the possibility that the shadows are phlebolite or calcified bodies, a screen or plate examination should be made before the opaque enema is given. If obstruction exists the consequent filling defect is not distinguishable from that in cases of carcinoma.

We did not fully recognize the value of the rœntgen ray in the diagnosis of diverticulitis until 1914. In that year Carman reported three cases; in the first case he had not been able to account for the small barium shadow outside the lumen of the bowel. From the clinical facts and rœntgen appearance, W. J. Mayo suggested the possibility of diverticulitis. Since that time rœntgen examinations have been of the greatest value in diagnosis.

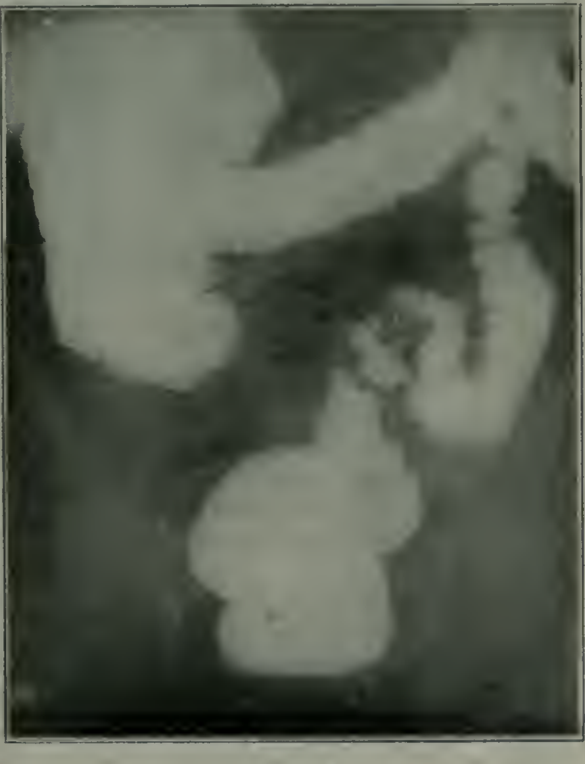

FIG. 4.—Diverticulitis of the descending colon and sigmoid with definite obstruction.

Treatment. The treatment of diverticulitis of the large intestine naturally varies with the phase of the disease and the condition of the patient. In the acute condition the treatment is the same as for acute appendicitis. The diverticulum should be removed if possible and the stump treated like the ordinary stump of the appendix. Care must be taken, however, not simply to invert the stump into the subserous fat which is often over-developed in these cases. Such a procedure would undoubtedly result in the development of an abscess later. The serosa and fat should be well freed from the base of the diverticulum and the latter inverted into the muscular wall. If there are other diverticula it is generally best not to attempt to remove them when removing one that is acutely gangrenous or one that is ruptured, but later to arrange to perform a second operation. If an abscess is found it should be drained, and in case of obstruction a colostomy should be made at the same time.

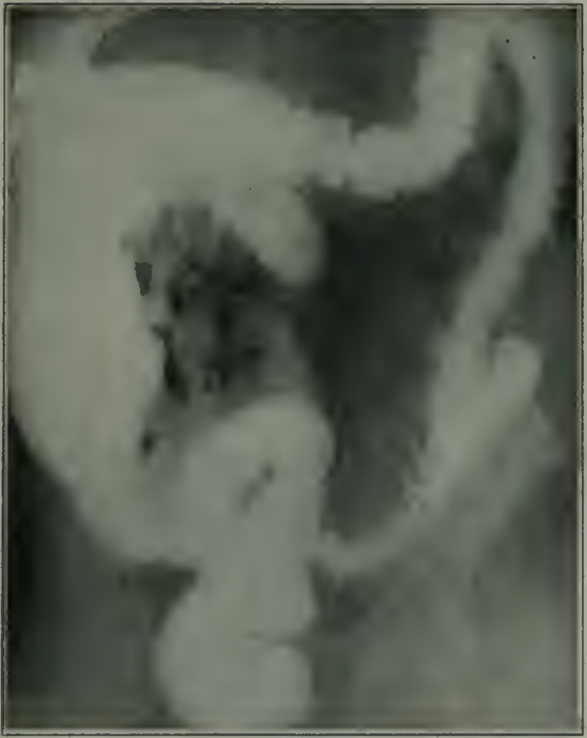

Fig. 5.—Diverticulitis of the descending colon and sigmoid.

In the subacute and chronic cases in which there is tumor formation, resection is generally indicated with or without primary colostomy. If the involved part of the bowel can be well freed and delivered outside the abdomen, a Mikulicz type of operation, to be completed in two or three subsequent stages, makes a simple and relatively safe operation and is particularly suited to the case that is a poor surgical rick.

In suitable cases resection of the involved area followed immediately by an end-to-side, end-to-end, or lateral anastomosis is the ideal treatment.

If the rectum is involved (there were several cases in our series) some form of posterior resection is made and, if possible, the sphincter muscle should be saved. It is probable that some of the severe perirectal infections that are followed by stricture and looked on as syphilitic are the result of this disease (Giffin). In some cases very extensive combined anterior and posterior resections are indicated.

A patient with involvement of the distal half of the colon is now under my observation. Ten months ago I explored and found a mass in the pelvis, apparently around the rectosigmoidal juncture. Proctoscopic examination did not show ulceration on the mucous surface and there was no history of blood in the stool; there were numerous diverticula in the sigmoid and descending colon. The mass was believed to be inflammatory and a temporary colostomy was made. About eight months later I received a letter from the patient stating that considerable chocolate-coloured mucus was discharged from the anus several times each day. I advised him to return and on examination found definite evidence of an early malignant condition in the rectum about 7 cm. above the sphincter. April 29th, 1920, I resected the colon from the middle of the transverse colon to the beginnirg of the rectum, excising the old colostomy and bringing the transverse colon out in the left rectus about 5 cm. below the umbilicus. Operating was rather difficult on account of adhesions that had resulted from the previous operation and it was thought best not to prolong the procedure by performing a posterior resection of the rectum, including the malignant growth. I had hoped to perform the second stage of the operation in ten or twelve days, but an unfortunate wound infection made it advisable to postpone this for the present. June 4th, 1920, a posterior resection of the rectum was performed under combined local and general anæsthesia. Firm inflammatory adhesions to the prostate were found but no evidence of the extension of the malignancy outside the bowel. The patient recovered normally from the operation and twenty days afterwards is about to be dismissed from the Clinic.

Non-surgical measures are frequently indicated, especially in the aged and in patients whose condition is discovered accidentally. The bowel movements should be kept fluid or at least soft, thus preventing distention of the pockets with fecal matter and the formation of fecaliths which predispose to infection and ulceration.

Summary

Diverticula of the bowel are of two kinds: True diverticula in which all structures of the bowel wall are represented, and false or acquired diverticula, in which the muscular wall is lacking, at least in part. False diverticula or mucosal hernias are found more commonly in the large bowel than is generally realized. In some cases they give rise to few or no symptoms; in other cases they produce alarming and often fatal sequelæ. The condition is frequently confused with malignancy, even at the present time.

Two hundred and fifteen patients with diverticulitis of the large bowel have been treated at the Mayo Clinic since 1904; one hundred and twelve were operated on; one hundred and three were not operated on. Diverticula were also found in the wall of the appendix in seventy-three patients operated on for appendicitis. Few of the patients were less than thirty years of age. There were twice as many men as women. Their general condition was good unless obstruction had occurred. The symptomatology and sequelæ were very similar to those of appendicitis. In fourteen cases carcinoma was secondary to diverticulitis. The sigmoid was involved more frequently than any other part of the bowel.

Rœntgen ray diagnosis of intestinal diverticulitis is practically proof positive of the disease. Before the introduction of the roentgen ray, in 1914, as an aid to diagnosis, relatively few cases were recognized before operation or necropsy. Many patients with numerous pouches live until old age and have little or no inconvenience by keeping the stool fluid. The surgical treatment varies from simple amputation of a single saccule to very extensive resection of the bowel.

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THE TREACHEROUS SYMPTOMS CAUSED BY AN APPENDIX IN THE PELVIS

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It may seem superfluous to attempt to add anything original to the already vast amount of literature on the subject of appendicitis, but even if this article sets forth nothing new it is at least based on the knowledge gained by personal observation of actual cases in which the diagnosis was decidedly obscure.

The volume of the sacred law tells us "there is nothing new under the sun", but the more one compares the surgical findings with the sometimes obscure clinical picture the less one is apt to view the adage in its literal sense.

Although appendicitis is one of the most common of surgical diseases and one whose classical signs and symptoms are familiar to all medical men, it is often one of the most difficult to diagnose, especially when the appendix is misplaced. The characteristic phenomena of an ordinary attack are usually partially, and may be wholly absent, and an entirely different chain of symptoms develop when the appendix is located at the brim or in the cavity of the true pelvis. Doubtless there are fewer mistakes being made now-a-days, since the disease is very much better understood, and the importance of an early disgnosis is recognized, but the common occurrence of the malady makes it vitally important to detect the atypical, as well as the typical, type.

The appendix, like people, influences its associates and may be judged accordingly. Therefore, if the appendix associates itself with the rectum and the bladder in the male, or any of the different pelvic organs of the female, we must bear in mind the clinical symptoms that are apt to be created thereby, so that if one is called early in an attack to see a patient suffering from pain, either high or low in the abdomen accompanied by vomiting, but with absence of localized tenderness, inquire whether there is frequency of micturition or painful defecation. One or both of these symptoms frequently occurs. There may be no rigidity at first, but as the case develops the muscular tension begins to make its appearance low down on the right or sometimes in both recti muscles. This is usually soon followed by tenderness over the right inguinal region or immediately above the pubes. There is sometimes slight flexion of the right thigh. I have found temperature and pulse rate of very little aid in these cases, nor similarly the dry, furred tongue; in fact, by the time there is fever with dry, furred tongue and accelerated pulse, pus is usually present, and the other clinical signs are well in advance, and have made the condition fairly apparent. In my series of cases there has been very little diarrhœa except as might be explained by the patient having taken strong purgatives. Russell Howard notes this occurrence, however, in about 25 per cent. of cases. The history of general abdominal discomfort or chronic dyspepsia, without other apparent cause, is very suggestive of a chronic appendix in the pelvis. The classical signs are not so well marked and are tardy in appearance, due apparently to the slow absorption by the pelvic peritoneum.

In making a differential diagnosis many other conditions must be borne in mind, such as calculus of the ureter or bladder, the various forms of intestinal obstruction, gonococcal peritonitis in the female, and the many other inflammatory conditions of the pelvis or abdominal cavity. The history of some characteristic feature, such as blood in the urine, the presence of a mass in hernia, a vaginal discharge, etc., will usually direct one to a correct conclusion.

But upon what must we depend to make a reasonably certain early diagnosis of appendicitis?

1. After getting complete history of the case and making a careful examination of the patient, do not neglect to make a rectal examination. This is of great importance and there is no reasonable excuse for omitting it. It is surprising how often you will be able to detect a long, tender mass high up in front of the rectum. Whether or not a mass is felt there is usually pain or marked discomfort referred to the lower right side of the abdomen, which is accentuated by bimanual pressure.

2. Whenever possible have a white blood count made. A leucocytosis suggests at once an in-

flammatory condition and consequently narrows down materially the possible diseases causing the symptoms.

3. Do not under any circumstances give morphia. As long as you have the slightest cause for suspicion of appendicitis, intestinal obstruction, or other acute abdomen, avoid narcotics. Any acutely inflamed appendix, whether in the normal or abnormal position, requires immediate operation. The operation can never be too early, but it may be too late. If the pain is severe apply heat, give emetics and temporize by various means, but do not disguise the symptoms and thereby delay the possibility of an early operation by giving morphia.

4. If it seems necessary to wait for further signs and symptoms to make a diagnosis, stop all food, keep the patient in the Fowler position and watch closely for tenderness or rigidity low down on the right rectus.

I shall not weary you with case reports of a series of cases, but will merely describe a couple to emphasize the difficulties of diagnosis.

CASE 1. T. W. Patient complained of indefinite pain in abdomen, vomiting, gas on stomach, no diarrhœa. This was a telephone call, answered by Dr. R. J. Spence, of Danforth Avenue, who was with me at the time. Dr. Spence suggested visiting the patient, but he refused, stating he had often had these attacks of indigestion while out West, and only required medicine. Bismuth subnitrate powders were prescribed. I inquired over the telephone later in the day and learned that the pain was gone and he was feeling much improved. Four days later he appeared at my office complaining of weakness, lack of energy, occasional pain in the abdomen but no nausea, and that he was sleeping poorly. Gave also a history of constipation, painful defecation and frequency of micturition. Temperature 101 2-5°, pulse 88. Slight tenderness, but doubtful rigidity over lowest part of right rectus. Urine analysis normal, patient sent to hospital. W.B.C., 24,600. Rectal examination disclosed a long, tender mass high up between rectum and bladder. Immediate operation was advised. Patient refused, but consented the next day owing, apparently, to the pain not having been relieved.

Operation. Low mid right rectus incision. Found cæcum low and bound down. Ileum went straight down into pelvis. Appendix crossed behind it and traced to a mass between bladder and rectum. About one dram of pus escaped. Thickening of the appendix extended on the cæcum, appendix raised, used electric cautery for removal, plain cat-gut on stump, two large split tube drains placed in wound. Patient made good recovery.

CASE 2. A. L. Patient of Dr. Corcoran, Elmvale. A pain soon after dinner, patient took a dose of baking soda, which usually relieved, about 3 p.m. Pain became worse now in epigastrium, and over left side of abdomen; vomited, had bladder irritation with pain in penis. About 6 p.m. Dr. Corcoran was called, gave morphia, which relieved fairly well until noon next day. Dr. Corcoran called Dr. A. T. Little, of Barrie, in consultation, who advised immediate removal to the hospital. On his arrival in the evening, I found tenderness low down on both sides of abdomen, but slightly worse on right side. This was aggravated by rectal examination but no mass was detected. White blood cells, 16,000. Operated upon immediately, low right rectus incision; free fluid encountered at once, packed off general peritoneal cavity, mopped out seropus, appendix gangrenous and ruptured, raised from pelvis, removed by aid of electric cautery and by using cat-gut on stump. Three large drains placed in wound. Patient made good recovery.

I might quote other cases, but enough has been said to show the difficulties of diagnosis, the value of rectal examination, the inadvisability of morphia and to prove the worth of the white blood count.

In closing I may say that in chronic cases of abdominal distress I have found the barium meal and *x*-ray examination of value. While the appendix is not always demonstrated the location of a very low cæcum may be very significant, and may lead to the correct interpretation of an indefinite collection of symptoms. Remember that the inflamed appendix in the pelvis gives one of the most treacherous types of the disease due, no doubt, to the slower absorption of toxines by the pelvic peritoneum, and to the consequent lateness or irregularity in the development of symptoms.

BRIGHT'S DISEASE IN PRACTICE

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Toronto, Ontorio

SINCE Richard Bright, in 1827, correlated the presence of albuminuria and dropsy with disease of the kidneys, *Bright's* disease or nephritis, has been a subject of perennial interest to both the physician and the layman. These names, however, have included conditions of such wide clinical and anatomical latitude, that they convey no precise meaning to the physician to serve to guide him either as to the ætiology, the course, prognosis or treatment of the condition. The attempts once made to associate various clinical types of albuminuria and other urinary and systemic findings with definite anatomical changes in the kidneys, failed of verification at autopsy so frequently that a classification of Bright's disease, on anatomical grounds, has been recognized as inadequate. There is no definite relationship to be established between the nature and degree of morbid change in the kidneys and the attendant clinical phenomena, including findings by urinalysis.

The following represents a more recent classification of nephritis, though it is recognized that there is no hard and fast line demarcating the various classes.

1. Tubular nephritis.
    (a) Mild—albumen—from a trace to a considerable amount; casts—hyaline, granular.
    (b) Severe—albumen; casts—hyaline, granular, epithelial, fatty; œdema.
2. Glomerular nephritis.
    (a) Acute with œdema, albumen, hæmaturia and tendency to uræmia.
    (b) Subacute—few renal symptoms; hypertension.
    (c) Marked hypertension, fixation of specific gravity, nocturnal polyuria, eye symptoms, tendency to uræmia, anæmia, etc.
3. Renal sclerosis.
    (a) Primary—following acute interstitial.
    (b) Secondary—following glomerular and mixed nephritis.
    (c) Arterio-nephritis or benign sclerosis.
    (d) Arteriosclerotic atrophy.
4. Nephrosis—a term applied to the albuminuria secondary to poisoning by phosphorus, mercury, various toxæmias and febrile conditions, as typhoid fever, Grave's disease, etc.

The study of nephritis has more recently been approached from the functional side and tests have been introduced to estimate the *functional* capacity of the kidneys, not alone as an index to their excretory efficiency but as a measure of the degree of pathological change affecting them. Certain limitations of these functional tests may be mentioned.

1. They focus too much attention on the kidneys alone, thus tending to minimize widespread systemic changes associated with certain forms of Bright's disease.

2. They attach importance often to remote effects rather than emphasize the causes which underlie them.

3. The kidneys are complex in their structure and function, different parts showing a selective capacity in dealing with the elimination of different materials, metabolic or extraneous, so that the capacity of the organs to excrete any one of these cannot too rigidly be accepted as an index to the organic functional capacity as a whole. This applies equally to normal products of excretion and presumably to drugs injected for purposes of testing functional capacity.

Of the latter, the phthalein test has been most widely accepted as of real clinical value.

The response of the kidneys to the ingestion of fluids by a corresponding change in the specific gravity of the urine, is taken as an evidence of the elasticity of normal renal function.

The response of the kidneys to a diet, definite as to quantity and composition, is readily carried out and represents a valuable addition to our methods of estimating renal function.

Nocturnal polyuria, a compensatory process, designed to carry off the excess of waste materials which have accumulated during the day, and the failure of the normal function of the

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kidneys to concentrate the urine, evidenced by a fixed, low specific gravity, are well recognized as important evidences of functional impairment.

Chemical examination of the blood, to determine the total non-protein nitrogen and its various constituents, creatinine, uric acid, urea-nitrogen, etc., is of value as an index to the degree of nitrogenous retention, thus assisting the clinician in arriving at a prognosis in a given case. Repeated examinations serve as a check on the progress of a case and the efficiency of treatment, and as an indication for the necessity of restriction or non-restriction of proteins in the dietary. Further, chemical blood examination and functional kidney tests are necessary in distinguishing the hypertension of Bright's disease from essential hypertension or hyperpiesis (Allbutt), the absence of nitrogenous retention in the latter, permitting a more liberal protein dietary than would ordinarily be permissible in the former.

These tests also enable one to distinguish the uræmia associated with retention of the end products of protein metabolism, in which eliminative treatment and a high carbohydrate—low protein diet are indicated, from the type in which no retention is demonstrated by present methods.

They are of more value in chronic than in acute cases, where the therapeutic indications are for rest, to spare the kidneys by restriction of fluids and the allowance of a very limited amount of bland diet. By these functional tests we obtain more precise data, and a fuller grasp of a case, but our own experience would not accord them a practical value beyond more ordinary clinical methods which, properly, they should supplement but not replace, It must not be forgotten that marked degrees of nitrogenous retention and greatly increased creatinine are accompanied by other clinical evidences of toxæmia.

The relative value of these newer methods, as compared with those longer known, will be best exemplified in the lantern slides which we shall show you later. It cannot be too strongly emphasized, however, that these methods and the other data of a comprehensive clinical investigation, are in no wise mutually exclusive, but both have their value in elucidating a case.

The estimation of chlorides is of use in enabling one to determine whether chloride retention is a factor in an attendant œdema and if their restriction in diet is called for. We have not found much practical advantage from the estimation of the CO_2 tension of the blood and alveolar air as an index to acid intoxication in ambulatory cases, though they may be in the more advanced and bedridden. In forming an opinion as to the seriousness of a given case, the blood pressure, degree of anæmia, the condition of the heart, and the information obtained by the opthalmoscope, are all of the greatest importance. Marked degrees of hypertension, severe anæmia, evidences of cardiac decompensation, and above all albuminuric retinitis are ominous signs in chronic cases. I (Anderson) have seen many cases of the latter, but never one that lived a year after the condition was first observed.

The general systemic condition, therefore, is equally or more important than the renal evidences of disease in forming a prognosis.

As in all clinical laboratory procedures, functional and other tests must be considered in relation to other clinical phenomena.

A point of the greatest practical importance is to determine whether there is a removable cause such as syphilis, or a chronic focal infection about the teeth, tonsils, sinuses or elsewhere, to account for the persistence, recurrence or progressiveness of renal symptoms. There is no doubt that the tendency of nephritis to be progressive, is often due to the persistence of the original cause of trouble, and the possibility of finding and removing such cause has, therefore, an all important bearing on prognosis, necessarily of greater practical moment than the evidences of functional impairment due to such infection.

Apart from the more difficult laboratory procedures, I am convinced that simpler and easily applied methods are often neglected or imperfectly carried out. I refer to the measuring of the twenty-four hour specimen, estimating separately the day urine and the night urine, taking the specific gravity of a mixed twenty-four hour specimen, comparing the fluid intake with the output, estimating the degree of acidosis by the administration of alkalis (Sellard's test). Albuminuria, in itself, has not any definite prognostic significance. The transient intermittent or orthostatic albuminuria of adolescence does not, in itself, carry any serious significance. The importance of albuminuria therefore, should be estimated in connection with all the other associated clinical phenomena.

Osler, in 1911, published a paper in the *New York Medical Journal*, on "The Advantages of a Trace of Albumen and a few Tube Casts in the Urine of certain Men over Fifty Years of Age". I have always thought that a series of reports of mine (Anderson) on the urinalysis of a case in which he had a deep personal interest, prompted him to write this paper. The patient had a persistent, moderate albuminuria, with some hyaline and granular casts and red blood corpuscles. With my knowledge at that time, of necessity largely formed by text-books, I had been lead to express a rather gloomy prognosis. This patient has since lived a strenuous public life, and I frequently see him twenty years later, at seventy-five years of age, walking jauntily past my office, smoking a cigar, on his way to business. In his paper, Osler quoted an ancient authority, who stated that "The Pisse is a harlot and a liar" and generally denounced the "pisse-prophets", maintaining that a trace of albumen and a few casts served at times as the "red lights" which warned of danger ahead, to be averted by a timely application of the brakes in the way of more rational living. This opinion, of course, accords with one's wider clinical experience, and warns one not too readily to prophesy early disaster on limited data of varying significance.

Since that time, I (Anderson) have seen many cases of marked and long continued albuminuria, with casts, eventually clear up. One case was that of a Hebrew—long familiar as a visitor to the hospitals in Toronto—over fifty years of age, who for years had up to 10 per cent. bulk of albumen in the urine, and who went practically blind from detachment of the retinæ, for which he went to Vienna to consult Fuchs. He was an excellent patient, and followed instructions as to diet, etc. implicitly. I eventually lost track of him for some years, and when he presented himself for re-examination I found that the urine had entirely cleared up, he had no anæmia, blood pressure was normal, and apart from almost complete blindness, he was physically in excellent condition.

Some years ago, I was consulted in regard to a man twenty years of age, a commercial traveller, who had gradually developed in November, 1908, general anasarca when on a business trip in British Columbia. He was unable to be brought home until the following April, at which time he presented extreme general anasarca, the urine was reduced to 8 oz. per diem, and laden with albumen and hyaline and granular casts, though he was not extremely anæmic. His blood pressure was normal and the heart was good. He had effusion into both pleural and peritoneal cavities. His condition continued as above with fluctuations until the following autumn, when it began gradually to clear up and by January, he was so well that he was accepted by a local insurance company on a twenty-year endowment policy.

In my experience, these favourable cases are unaccompanied by extreme anæmia, cardiac symptoms, hypertension or retinitis, and often a removeable cause can be discovered. No insurance referee will underestimate the serious significance of albumen and casts in the urine, regarding their presence or recurrence at intervals over a long period as a grave impairment which will disqualify the applicant for insurance. Clinically, however, we must recognize the fact that all cases of albuminuria are not progressive, complete cures may occur, and even the persistence of albumen if unassociated with other signs, as before mentioned, is not in itself necessarily incompatible with long years of useful life.

In the diverse conditions connoted by the term "Bright's disease", what is required is a complete investigation of the patient, including his hereditary tendencies, environment, diet, etc., a search for focal infections, syphilis or other source of systemic poisoning, for all systemic or organic evidences of disease, as anæmia, hypertension, cardio-vascular disease, and all other information available by clinical and laboratory methods. Upon the broad basis of the information thus obtained, we will be best enabled to envisage the whole condition, and to prognosticate and treat most intelligently.

In the following cases selected from a large number the clinical and laboratory data are contrasted to exemplify their relative importance.

To refresh the memory the following tables of normal values is appended.*

I.—F. E. Age fifty-seven, manufacturer. height, 5 feet, 8 inches. Weight, present, 260 lbs., greatest, 278 lbs. January 12th, 1920.

Clinical data.

Hæmoglobin, 100 per cent.
Dyspnœa, marked.
Teeth, septic.
Tonsils, enlarged.
    Strep. Viridans.
    Staph. Albus.
Œdema of extremities.

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*Non Protein Nitrogen 25 to 35 mgms. per 100 c.c. of blood.

Urea N. 12 to 23 mgms. per 100 c.c. of blood.

Creatinine 1 to 3 mgms. per 100 c.c. of blood.

Chlorides in the urine 10 to 15 grams per diem.

Phthalein excretion 60 to 80 per cent. in two hours.

Normal daily range of specific gravity of the urine about 10 points.

700 c.c. and over would constitute nocturnal diuresis though obviously no fixed quantity can be stated as a normal upper limit, but many normal cases exceed this.

Cardio-vascular.
Blood pressure, 190-120.
Apex at nipple line.
Compensation, poor.
Vessels, normal.

Fundi—normal.

Urine—Acid.
1023.
Albumen, marked—5 per cent. bulk.
No casts.
Leucocytes.

Laboratory data.

Response to Nephritic Test Diet.

Hour	Quantity	Specific Gravity
12 p.m.	150 c.c.	1019
2 p.m.	82 c.c.	1023
4 p.m.	224 c.c.	1020
6 p.m.	120 c.c.	1021
8 p.m.	120 c.c.	1023
Total day urine	696 c.c.	

Daily range of specific gravity 4 points.

Total night urine, 8 p.m. to 8 a.m., 465 c.c.
Specific gravity 1023.
Night urine normal in amount and well concentrated.
N.P.N. 80 mgms. per 100 c.c. (marked increase)
1 month later 53 mgms. per 100 c.c.
2 months later 33 mgms. per 100 c.c.

Phthalein, 1st hour, 28 per cent.
2nd hour, 13 per cent.

Total 41 per cent

1 month later, 30 per cent.
2 months later, 56 per cent.
Wassermann, strongly positive.

With clearing up of the marked oral sepsis, the albuminuria and œdema gradually disappeared, the blood pressure dropped and the cardiac symptoms improved—in all a fairly satisfactory recovery has taken place. A difficult problem was to decide on the therapeutic indication of the positive Wassermann and this was met by careful intermittent administration of hydrarg. cum creta. In this case the ordinary clinical data were evidently of greater value than the laboratory, though the latter helped to elucidate the clinical picture, indicating the importance of considering the data side by side rather than looking upon them as mutually exclusive. The marked increase in phthalein output and the decrease in non protein nitrogen are evidences of improvement and these changes were coincident with the general progress of the case.

II.—G. E. Age fifty, farmer. Weight, present, 240 lbs., greatest, 242 lbs. March 24th, 1917.

Clinical data.

Hæmoglobin, 80 per cent.

Cardio-vascular.
Blood pressure, 200-124.
Apex, normal.
Muscle, deficient.
Dyspnœa on slight exertion.
Arteries, O.K.

Urine—Acid.
1020.
Albumin, trace.
Casts, hyaline, granular.

Laboratory data.

Response to Nephritic Test Meal.

Hour	Quantity	Specific Gravity
12 p.m.	95 c.c.	1022
2 p.m.	70 c.c.	1025
4 p.m.	80 c.c.	1022
6 p.m.	90 c.c.	1021
8 p.m.	130 c.c.	1020
Total day urine	465 cc..	

Daily range of specific gravity 5 points.

Total night urine, 8 p.m. to 8 a.m., 810 c.c.
Specific gravity, 1012.
Large in amount.
Fairly well concentrated.

October 27th, 1919.
Creatinine, 1.7 mgms. per 100 c.c. } within normal limits.
Urea N. 29 mgms. per 100 c.c. } within normal limits.

November 8th.
Creatinine, 2·14 mgms. per 100 c.c.
Urea 42·8 mgms. per 100 c.c.
Phthalein, 1st hour, 25 per cent.
2nd hour, 10 per cent.

Total 35 per cent.

Wassermann was negative though there was a history of a previous attack of syphilis and addiction to alcohol.

The patient made temporary improvement but eventually developed influenzal pneumonia and died December, 1919. The low phthalein output, nocturnal polyuria and fixation of specific gravity are of interest, though the clinical data evidences the seriousness of the case.

III.—H. H. P. Age thirty-one, bookkeeper. Weight, present, 143 lbs., greatest, 170 lbs. April 8th, 1918.

Clinical data.

Onset 3½ months previously following "Flu."

Hæmoglobin—90 per cent.
Œdema of extremities.
Breath—uræmic—vomiting.

Cardio-vascular.
Blood pressure, 175-120.
Apex—normal.
Compensation—satisfactory.
Vessels—normal.

Fundi—discs—swollen.
hæmorrhage in spots.

Urine—Acid.
1010.
Abumin, 5 per cent. bulk.
No casts.
Leucocytes.

Laboratory data.

Response to Nephritic Test Meal

Hour	Quantity	Specific Gravity
12 p.m.	375 c.c.	1011
2 p.m.	100 c.c.	1010
4 p.m.	170 c c.	1010
6 p.m.	150 c.c.	1010
8 p.m.	115 c.c.	1011

Total day urine, 910 c.c.

Daily range of specific gravity 1 point.

Total night urine, 8 p.m. to 8 a.m., 240 c.c.
Small in quantity and dilute.
Weak.
N.P.N. 153·6 mgms. per 100 c.c.

Creatinine 8·23 mgms. per 100 c.c., marked excess.
Phthalein 10 per cent. in 2 hours—extreme reduction.
Outcome—died July 10th, 1918.

In this case both clinical and laboratory data indicated the seriousness of his condition. The absence of nocturnal polyuria is notable, also the fixation of specific gravity at a low level, the marked increase of creatinine and low phthalein output.

IV.—H. H. Age thirty-seven, comptroller. Height, 5 feet, 8 inches. Weight, 155 lbs. July 14th, 1920.

Patient had passed for Life Insurance the previous year.
Began as an acute hæmorrhagic nephritis, April, 1919.
Onset of illness perhaps six weeks or two months before.

Clinical data.

Hæmogobin, 70 per cent.
Teeth—very septic.
Tonsils—definite infection.
Œdema—generalized.

Cardio-vascular.
Blood pressure, 130-80.
Apex—normal.
Compensation—good.
Vessels—good.

Urine—Dark, smoky or red.
Acid.
1016.
Oliguria, at first—8 oz. per diem.
Albumin 8 per cent. at first (bulk).
Casts—in large numbers.
Red blood cells—in large numbers.
White blood cells.

Septic teeth extracted June, 1918.
Tonsils treated by Dr. Royce.
Complete recovery after one year.

Laboratory data.

Response to Nephritic Test Meal.

Hour	Quantity	Specific Gravity
12 p.m.	115 c.c.	1015
2 p.m.	85 c.c.	1015
4 p.m.	80 c.c.	1018
6 p.m.	85 c.c.	1019
8 p.m.	95 c.c.	1016
Total day urine	460 c.c.	

Range of specific gravity 4 points. Total night urine 8 p.m. to 8 a.m., 480 c.c.
Specific gravity, 1017.
Normal amount.
Dilute.

N.P.N. of blood 58·1 mgms per 100 c.c., (on June 26th).
N.P.N. of blood 42·2 mgms. per 100 c.c., (on July 14th).
Phthalein, 1st hour, 30 per cent.
2nd hour, 10 per cent.
Total 40 per cent. (June 20th).
Total 45 per cent. (July 14th).

Wassermann—clearly negative.

The reduced hæmoglobin noted at the beginning was accounted for by the hæmorrhage from the kidneys. The importance of removing foci of infection in teeth, tonsils or elsewhere is well demonstrated by this case.

V.—Mrs. M. Age forty-seven, housewife. Weight, 160 lbs. March 20th, 1920.

Clinical data.

Hæmoglobin—90 per cent.
Teeth—septic.
Tonsils—enlarged.
Staph. aureus.

Cardio-vascular.
Blood pressure, 240-130.
Apex—nipple line.
Mitral systolic murmur.
Vessels—good.

Fundi—normal.

Urine—Acid.
1028.
No albumen.
No casts or red blood cells.

Laboratory data.

Response to Nephritic Test Meal

Hour	Quantity	Specific Gravity
12 noon	80 c.c.	1028
2 p.m.	65 c.c.	1025
4 p.m.	54 c.c.	1029
6 p.m.	32 c.c.	1030
8 p.m.	30 c.c.	1030
Total day urine	261 c.c.	

Daily range of specific gravity 5 points.

Total night urine, 8 p.m. to 8 a.m., 1030 c.c.
Specific gravity, 1030.
Small in amount and concentrated.

Non-protein nitrogen of blood 30 mgms. per 100 c.c.

Phthalein, 1st hour, 48 per cent.
2nd hour, 14 per cent.
Total 62 per cent.

Wassermann—negative.

In this case the laboratory findings, reduced daily excretion, absence of nocturnal polyuria, the capacity of the kidneys to concentrate the urine, the absence of nitrogenous retention and the response to the phthalein test, were favourable. The oliguria and high specific gravity suggested the freer drinking of water, while the absence of nitrogenous retention contraindicated too rigid restriction of proteins in the diet.

April 7th, 1920. Gallstones were removed from cystic duct, and cholecystectomy performed by Dr. Wallace Scott. She improved rapidly. Blood pressure fell to 180-130.

May 3rd, 1920. Left hospital feeling very well; tonsils still infected

July, 1920. After over-exertion, she developed acute hæmorrhagic nephritis, marked hypertension, cardiac decompensation, double basal pneumonia. Temperature up to 103° F or more, is now gradually improving; has not been sufficiently well to have tonsillar enucleation done.

In this case the clinical findings indicate a more serious condition than the laboratory, which has been borne out by subsequent progress of the case.

VI.—B. G. Age forty-eight, manufacturer. Height, 5 feet, 8 inches. Weight, present, 163, greatest, 170. November 26th, 1918.

Clinical data.

Hæmoglobin—90 per cent.
Breath—uræmic.
Teeth—septic.

Cardio-vascular.
Blood pressure, 245-145.
Apex—normal.
Muscle—weak.
Dyspnœa—moderate.
Temporal arteries, tortuous.
Fundi—double choked discs.

Urine—Acid.
1024.
Albumin, trace.
Casts—granular, hyaline.

Laboratory data.

Response to Nephritic Test Meal.

Hour	Quantity	Specific Gravity
12 p.m.	100 c.c.	1015
2 p.m.	60 c.c.	1019
4 p.m.	90 c.c.	1019
6 p.m.	100 c.c.	1020
8 p.m.	80 c.c.	1020
Total day urine,	430 c.c.	

Daily range in specific gravity 5 points.

Total night urine, 8 p.m. to 8 a.m., 850 c.c.
Specific gravity, 1010.
Large in amount and dilute.

N.P.N. 40 mgms. per 100 c.c
Urea 20 mgms. per 100 c.c.
Phthalein, 1st hour, 36 per cent.
2nd hour, 12 per cent.

Total.....48 per cent.

Wassermann—negative.

The nocturnal polyuria, moderate fixation of specific gravity at a high level and moderate reduction in phthalein output are of interest though the clinical data gave clearer evidence of the seriousness of the case. The patient died.

VII.—J. McC. Age forty-four, clergyman. Height, 5 feet, 10 inches. Weight, present, 157, greatest, 188. February 28th, 1920.

Clinical data.

Hæmoglobin, 95 per cent.
Septic teeth.
Enlarged tonsils—pus—Strep. viridans.

Œdema of lower limbs.
Dyspnœa.

Cardio-vascular.
Blood pressure, 220-150.
Apex—normal.
Muscle—normal.
Vessels—thickened.

Fundi—arteries tortuous.

Urine—Acid.
1015.
Albumen.
No casts of blood cells.

Laboratory data.

Response to Nephritic Test Meal

Time	Quantity	Specific Gravity
12 p.m.	185 c.c.	1015
2 p.m.	100 c.c.	1017
4 p.m.	150 c.c.	1011
6 p.m.	165 c.c.	1015
8 p.m.	50 c.c.	1017
Total day urine......	650 c.c.	

Range in specific gravity 6 points.

Total night urine, 8 p.m. to 8 a.m., 840 c.c.
Specific gravity, 1015.
Large in quantity and dilute.
1 month later—range of 12 points in specific gravity. with night urine small and well concentrated.

N.P.N. 32 mgms. per 100 c.c.

1 month later—30 mgms

Phthalein, 1st hour, 39 per cent.
2nd hour, 13 per cent.

Total.....52 per cent.

1 month later, 58 per cent.

Wassermann—clearly negative.

The septic teeth and tonsils were removed and the patient showed marked improvement, which has continued since taking up his duties again

ŒSOPHAGEAL STRICTURES

D. W. Graham, M.D., F.A.C.S.

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CICATRICAL stenosis of the œsophagus, following upon the swallowing of corrosives, possesses considerable interest because of its rather frequent accidental occurrence, the rapid and consistent development of the stenosis, and also because of the varied appliances and the methods used in its treatment.

Many of us have occasion to treat such cases and not all of us have at hand such appliances or are adequately conversant with the methods of treatment to undertake the task without some hesitancy.

The condition is as a rule not difficult to manage, providing that care and gentleness be coupled with a thorough knowledge of procedure. It is also of convenience to the patient to remain near his home while he is undergoing the course of treatment which will require months and probably years before one is quiet certain that a cure has been established.

It is for this reason that I have reviewed the subject, and have presented what I would consider a case in the extreme, for treatment.

I will first consider a few details with respect to the landmarkings of the œsophagus. "It begins at a point behind the lower border of the cricoid cartilage on a level with the sixth cervical vertebræ; and joins the stomach about three-quarters of an inch after passing through the diaphgram. The lower level of the œsophagus is on a level with the spine of the twelfth dorsal vertebræ In the normal adult the upper level of the œsophagus is about six inches (15 cm.) from the incisor teeth, ten inches (28 cm.) to where the left bronchus crosses in front of the œsophagus, sixteen inches (40½ cm.) to the lower end of the œsophagus."

"The normal œsophagus presents two distinct constrictions, one situated at its beginning and one at a point where it crosses the left bronchus. Both constrictions are of the same size, and will admit without injury an instrument with a maximum diameter of four-fifths of an inch."

The course of the œsophagus is not always a straight one, but may present certain irregularities such as sacculations and tortuous undulations. These are usually considered as abnormal, but should be looked for in the treatment of such cases.

Œsophageal constrictions due to the swallowing of corrosives have been found at the following levels:

Guisez reports thirty-eight cases, most of them being located at the cardia.

Chevalier Jackson reports twenty-eight cases, eighteen being in the middle, six at the level of the hiatus, four near the crico-pharyngeus.

Charles J. Imperatori reports one at 15 to 16 cm. from the upper teeth, one at 27 cm. from the upper teeth, one at 2 cm. below the cricoid. And a second in the same case 34 cm. from the upper teeth.

Thomas Hubbard reports two cases, aged one year and five years, near the cardia, one case, six years, in the lower portion 8 to 10 cm. from the cardia.

Nathan W. Green reports one case, eight years, in the lower 4 inches (10 cm.) of the œsophagus.

E. M. Ebert reports a case in a child of four years at the upper border of the manubrium sterni.

One case in my own personal observation at the level of the left bronchus and a second lower down.

From the above one might judge that a cicatrical stenosis might occur at any point along the œsophageal tract, and that the point of election for such a condition to occur might vary with the point at which the peristaltic spasm might obstruct the descent momentarily.

"Strictures may arise after any inflammation produced by the swallowing of foreign bodies such as fish bones, coins, pins, plates of false teeth, etc., the impaction may be followed by ulceration, suppurative cellulitis, or even perforation and death from hæmorrhage; owing to one of the large vessels being opened."

The condition may also arise from specific causes such as tubercle, syphilis, thrush, or diphtheria.

Strictures may also be congenital in nature.

Simple strictures arise more frequently from the swallowing of corrosive poisons.

The healing of a gastric ulcer may also cause a stricture near the lower end of the œsophagus.

It is with stenosis due to the swallowing of lye that I propose to deal in this paper.

The swallowing of lye being particularly prone to produce a corrosive affect upon the upper digestive tract, regardless of the quantity, it has been suggested by several that lye containers be labelled as poisons.

Lye is more frequently swallowed by the child because of it being so carelessly handled and permitted to lie about where it is extremely accessible.

Shortly after its ingestion, œdema develops and the mucous membrane becomes macerated and soon peels off. As the acute inflammation subsides the symptoms of obstruction may entirely pass away, to be followed by gradually increasing difficulty in swallowing, which may not appear for some time and is not attended by pain. Fluids and soft foods are most easily swallowed, and these patients learn to chew their food well, to eat slowly and to swallow small quantities at a time.

Dilatation above the stricture often occurs and food accumulates in the dilated part, causing frequent regurgitation of food and mucus. As the obstruction increases the nutrition begins to suffer and a severe grade of emaciation and anæmia is finally reached, ending in death from starvation unless relief is obtained. Thomas Hubbard reports a case with the following unusual features: "Strictures involving the lower three or four inches of the œsophagus, the canal being very tortuous, with small sacculations between the constrictions."

The diagnosis of œsophageal strictures can be made by the administration of a bismuth or barium meal and radiography; two views should be made, a lateral and an antero-posterior view being taken, and the extent and character of the stricture studied stereoscopically. The fluoroscope may also be used. There is always danger in doing blind bouginage, as the tube may be easily perforated and a fatal cellulitis set up. At this juncture it might be well for me to report the case of a man, age forty-five, who came to me in 1913 complaining of having swallowed an unmasticated piece of beef, and that it had been lodged in his gullet and that it had been there for about three hours. I attempted to pass it by the use of an œsophageal bougie, but failed after several careful attempts. It was located at about the level of the left bronchus. I had him placed in the hospital for further attention. After a couple of hours he began to complain of excruciating pain in the epigastrium, his pulse became very rapid and of poor quality and symptoms of collapse were evident. Morphia and atrophine were administered without relief. I then decided to do a gastrostomy and explore the cardiac end of the œsophagus with my finger, and upon doing so I discovered that it was very difficult to enter. I dilated it thoroughly and had the patient brought back to the ward. He made a good recovery and could swallow food the following morning, and soon took soft foods and finally solids. I then closed the gastrostomy wound after a period of five days. Fourteen days later he developed a right sided empyema, which was drained in the usual way by rib resection. The wound took a long time to close but rapidly did so after the use of vaccines. He has been in excellent health ever since.

In the survey of the literature on œsophageal strictures I find that many different procedures have been adopted in their treatment. Mr. Kendal Frank used an Otis dilating urethrotone with blade removed which was screwed up and withdrawn fully expanded, this was done laterally and antero-posteriorly; an œsophageal bougie could then be passed from above.

Abbe, of Newport, advised what he calls the "string" method in the treatment of dense fibrous strictures. A gastrostomy having been previously performed, a small gum elastic bougie is guided through the stricture from below up into the mouth, and a stout silk ligature passed in the same way. This silk ligature being seesawed backwards and forwards, when the stricture was felt to yield. Large bougies are then passed.

Dunham caused a string to be swallowed and then used the Abbe method.

Ochsner draws a rubber tube under tension through the stricture, when the tension is taken off the tube, it expands and so dilates the stricture; in the course of a few days a larger and also double tubes are introduced. He is said to obtain good results.

Hubbard states: "That for safety and precision the Sippy method is ideal. The essentials are: First. Know your measurements; Second, be sure you are well into the stomach with wire guide and then go clear through with the properly selected olive bulb on the cable. If you try too large an olive and fail to get through you may pinch a band of stricture tissue between two of the olives on extraction, rather risky but even at that sometimes beneficial. The successful dilatation of strictures of this class makes possible, but does not ensure a cure. It is important to decide on the maximum dilatation, hold it there, and in children try to keep up with growth. It should be twenty-six in a three year old child and from thirty-five to forty in an adult. In holding a maximum dilatation the author favours passing a specially adapted olive bulb at frequent intervals, rather than the flexible bougie; one knows positively when one is through the stricture; with the flexible bougie, one is never quite sure. In cases in which the stomach has been opened, the stomach tube should be retained after dilatation is well advanced, to give confidence to the patient, and also in cases there is considerable trauma from dilatation, the œsophagus may be rested by direct feeding until inflammatory reaction has subsided."

The writer's case was a child of twenty months who had swallowed lye three months previously; ever afterwards he has had difficulty in swallowing; while at first he could swallow without vomiting it caused him to cry and he would take food with difficulty. About one month later he would regurgitate most of the food taken; liquids only being taken and retained and that in very small quantities. He gradually became pale and emaciated, when the parents for the first time became alarmed. The child seemed normal in every way apart from the palor and emaciation. A small sized olive pointed bougie was passed without great difficulty and others up to size 18 Fr. This was done once a week for three weeks. Regardless of the fact that the parents were warned of the necessity of returning regularly for treatment, they did not appear for two months, at which time the child was in a seriously aggravated condition, unable to retain even water or saliva. Repeated attempts were made at passing bougies of various sizes but all resulted in failure. The child being *in extremis* and in order to save its life a gastrostomy was deemed advisable. A thorough examination was made when it was found that a distinct sacculation existed above the level of the left bronchus and merely a suspicion of a little of the barium meal was seen to trickle through. We then tried to get the child to swallow a silk thread, but after repeated trials it seemed impossible. Gastrostomy was performed and retrograde dilatation carried out without great difficulty in the following manner: Following out a procedure very similar to that used by Abbe, a small filiform bougie was passed from below upwards through the stomach to the mouth. To the end of the bougie were fastened two coarse silk cords; these were drawn through the stricture and out through the mouth. To the lower end of one was interwoven a parachute contrivance consisting of four similar sized cords which were fastened to a circular cord in the same fashion, on which rode the various bougies until a 26 Fr was passed, retracting each bougie alternatively with the obturator.

These manœuvres were accomplished with but little difficulty. It was also discovered that a second obstruction was encountered at the lower end of the œsophagus. The gastrotomy wound was closed in the usual way.

Subsequent passage of a full size bougie for this particular age was done once a week for two months and later twice monthly and the interval being gradually lengthened up to the present. The result so far has been very satisfactory.

The object in using the four-corded parachute was to assist dilatation and do away with the see-saw method of Abbe.

The four cords are kept under tension by traction from below on the handle of the obturator. Thus the olive is guided through the stricture by the cords, each assisting in the process of dilatation.

The conclusions arrived at by the review of the various methods are as follows:

1. It would seem that complete stenosis of the œsophagus is a very rare condition.

2. One should make sure that the patient returns for treatment and that too long a time does not intervene between the various bougingages. It might also be wise to have him return once every six months for a period of several years or probably for life.

3. The earlier the stage in which dilatation can be done and the younger the patient the better the result.

4. The method of procedure for the different types of cases may be classified as follows:

(a) Those in which the stenosis will permit the passage of a bougie with or without the use of the œsophagoscope.

(b) Those in which one cannot successfully use an œsophagoscope. In these cases a Mixter's cord should be swallowed and the Sippy method adopted.

(c) Where there is almost a complete closure with a large sacculation above the stricture and there is existing a condition of water hunger. In this case it might be well to do a gastrostomy and a retrograde dilatation carried out, assisted, if necessary, by bouginage from above, under guidance by direct vision.

The worst type of case encountered is one where there exists multiple strictures, with sacculations in a tortous passage. In this type one should not wait too long before bouginage is carried out. The firm strictures at the upper levels may be dilated through the œsophagoscope and then retrograde process may enable us to complete the cure.

Slow dilatation seems less dangerous than the more rapid methods.

It has been found that in the use of the Sippy method that where formerly olive-tipped bougies were threaded over the silk cord as a guide, a stiffer guide would be much better, and piano wire having a small eyelet welded to its end has been used.

It would therefore seem advisable where bouginage fails with the assistance of the œsophagoscope, to adopt some such method as suggested by Sippy and its modifications.

On the other hand one is liable to failure in certain cases and the retrograde route will have to be adopted.

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The Fifth Annual Session of The American Congress on Internal Medicine will be held at Baltimore, Md., week of February 21-26, 1921.

The activities of the Congress will be largely clinical. Ward-walks, laboratory demonstrations and group or amphitheatre clinics will be conducted daily by members of the Medical Faculties of The Johns Hopkins and The Maryland Universities.

Further information may be secured by addressing The Secretary-General, 1002 N. Dearborn Street, Chicago, Ill.

THE PREVALENCE OF MALNUTRITION IN THE PUBLIC SCHOOL CHILDREN OF TORONTO

Alan Brown, M.B. and G. Albert Davis, B.A., M.B.

PREVIOUS to the war very little attention was paid to the question of malnutrition in older children, but in the examination of recruits so many men were found to be unfit for military service as a result of conditions following malnutrition that attention was then brought to bear on the condition as it appeared in children. It was found in the drafts for the United States army that one man out of five was unfit for active military service on account of physical disabilities brought about by malnutrition. Unfortunately we have not the corresponding figures for the Canadian army, although it is probable that the same proportion of disability would be present in our own country.

Surveys to ascertain the extent of malnutrition existing among school children have been made in various places. In New York, in the borough of Manhattan, of approximately 175,000 children who were examined 2·15 per cent. were found to be undernourished[1]. A recent writer[2] mentions 40 per cent. of a certain school in Kansas City as being undernourished. Many other surveys have been made in England and in the United States, but as far as we are aware no such work has been undertaken anywhere in Canada. With the idea of determining how much malnutrition was present in Canadian cities a survey was made of some of our Toronto schools.

There are various standards that one may adopt in determining the existence of malnutrition. The one which we have chosen is the relationship of weight to height, irrespective of age. The height and weight chart employed by us was prepared from measurements by Boas and Burke for older children[3] and for the earlier years from approximations of records by Holt[4]. Altogether the heights are averages of 45,151 boys and 43,298 girls, and weights of 68,000 boys and girls. It is to be noted that the chart is different to that of Wood's where age is taken into consideration. The reason for adopting the former set of standards in preference to Wood's is, that we feel the correct method is to disregard the age of the child, and to consider his height and weight only.

The survey was made in conjunction with the Department of Public Health of this city, through which department the nurses, who did the actual measuring and weighing, were supplied. Heights were taken with boots on, and an allowance made for the height of the heels. A little experience in this matter soon makes one quite proficient. Similarly, with the weights, allowances of one-half to one and a half pounds were made for boots according to the size and appearance of the latter.

The original intention in making the survey was to choose four schools representing the different types of our school population. To these four schools, however, has been added a fifth, where a mental survey of each child was being carried on under the direction of the Canadian National Association for Mental Hygiene. In this instance measurements and weights were made by the same individual making the mental survey, and these records have been added to our own.

The first school surveyed was York Street, where there is practically eighty per cent. foreign population. This school is situated in the downtown warehouse and small shop district. In this locality the population is very cosmopolitan, and includes Chinese, Japanese, Russians, Jews, Italians, and so on. Following this the children of Brown School were weighed and measured. This school is located in one of the best residential districts of the city, and contains children of parents in good financial circumstances. Withrow School, consisting of children of middle class parents, and Dufferin School, with children of the lower type of English speaking people, were the remaining two schools chosen. Western Avenue School, where the mental survey was also made, is in a good residential district; and socially stands between Brown and Withrow Schools.

In estimating the amount of malnutrition in the

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various schools, two standards have been employed. Emerson[5] states that a child 7 per cent. or more underweight for his height is malnourished, while Holt[6] considers a child 10 per cent. or more underweight for his height up to ten years of age and 12 per cent. from ten to sixteen years as belonging to this class. Both determinations have been made. In Tables 1, 2, 3, 4, and 5 will be seen in order the results obtained in the various schools. For convenience the results of each school have been placed together as seen in Table 6. Our results in these schools have been so striking that an estimate based on the relationship of weight to age was made in two schools, Withrow and York, and the results are seen in Tables 7 and 8. In Table 9 the results have been tabulated according to the grade in school in order to see whether there existed any difference in the amount of malnutrition present at the various ages. Finally in Table 10 will be seen the results of the mental survey made in conjunction with the nutritional survey. This was done to determine if possible whether there was any relationship between malnutrition and mental backwardness, as evidenced by the Binet-Simon method.

When we come to analyze our results we see that the greatest amount of malnutrition is present in the children of middle class people of native birth. The well-to-do, as also the foreigners, show the least amount of malnutrition. In Table 9 we see that malnutrition varies only to a slight extent in the different grades, and that it does not tend to decrease as the child gets older. From Table 7 it will be seen that the children in Withrow School, which probably holds true for the children of other middle class schools, are tall for their age; while the foreigners in York Street School (Table 8) are short for their age. These latter findings confirm us in our belief that the correct method of determining existent malnutrition is by the relationship of weight to height, irrespective of age. We, therefore, feel that the height and weight chart used in this survey is the best obtainable at the present time, and in the majority of instances shows the correct state of the child's malnutrition.

The mental survey made in one school of 336 children confirms the results found by Blanton[7] in the public schools of Trier, Germany; namely, that malnutrition, even when prolonged, affects to a very slight degree the intelligence of a child, as determined by the Binet-Simon method. However, children suffering from malnutrition shows a lack of physical and nervous energy which results in poor school work, and generally affects behaviour so that these children often appear listless and stupid. This latter finding is in agreement with the opinions of those handling classes of malnourished children, whose experience has been that as the state of a child's nutrition improves so does his mental condition.

SUMMARY

1. Of 2,843 children examined, 1,256 or 44 per cent. were 7 per cent. or more underweight and 751 or 26 per cent. were 10-12 per cent. or more underweight. Some may not be disposed to consider a child 7 per cent. underweight as malnourished, but a child 10 per cent. or more underweight is surely in a serious condition, and needs attention.

2. Estimating our total school population as 79,000, 26 per cent. or 20,540 are undernourished and in a serious state of health.

NOTE.—The authors are indebted to E. J. Pratt, Ph.D. for the mental survey conducted by him under the direction of the Canadian National Association for Mental Hygiene, and to the Misses Wheeler and Emory and the nurses in the various schools attached to the nursing staff of the Department of Health, for the routine weighing and measuring of the children.

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TABLE 1

YORK ST. SCHOOL

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	25	36	14	20	68
Junior & Senior 1st	18	25	9	212	70
Junior Second.....	5	17	1	3	29
Senior Second.....	10	29	4	11	34
Junior Third......	11	27	7	17	40
Totals........	69	28	35	14	241

Table 2

BROWN SCHOOL

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	31	32	18	19	95
Junior First.......	29	32	16	18	89
Senior First.......	28	43	21	32	65
Senior Second.....	25	20	13	10	127
Junior Third......	38	24	3	2	158
Senior Third......	43	31	26	19	136
Junior Fourth.....	39	31	21	17	124
Senior Fourth.....	25	28	13	15	88
Totals........	258	29	131	14	882

Table 3

WITHROW SCHOOL

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	39	51	25	32	76
Junior First.......	49	56	36	41	86
Senior First.......	40	56	29	40	71
Junior Second.....	32	45	17	24	70
Senior Second.....	54	67	33	41	80
Junior Third......	42	51	23	28	82
Senior Third......	59	56	38	36	104
Junior Fourth.....	28	53	22	42	52
Senior Fourth.....	19	38	9	18	49
Totals........	362	54	232	34	670

Table 4

DUFFERIN SCHOOL

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	51	75	39	57	68
Junior First.......	95	71	66	49	133
Senior First.......	66	62	40	38	105
Junior Second.....	43	57	25	33	75
Senior Second.....	45	58	25	32	77
Junior Third......	32	43	12	16	74
Senior Third......	35	50	20	29	69
Junior Fourth.....	26	53	14	28	49
Senior Fourth.....	12	33	3	8	36
Junior Fifth.......	11	57	8	42	19
Senior Fifth.......	3	33	2	22	9
Totals........	419	58	254	35	714

Table 5

WESTERN AVENUE SCHOOL

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Junior First.......	8	28	3	11	28
Senior First.......	3	20	2	13	15
Junior Second.....	24	46	17	32	52
Senior Second.....	7	33	6	28	21
Junior Third......	26	33	8	10	77
Senior Third......	42	60	24	34	70
Junior Fourth.....	25	54	12	26	46
Senior Fourth.....	13	48	7	26	27
Totals........	148	41	79	23	336

Table 6

School	7% or more per cent.	10% or more per cent.
York Street 80% foreign.....	28	14
Brown School..............	29	14
Western Avenue School......	44	23
Withrow School............	54	34
Dufferin School............	58	35

Table 7

WITHROW SCHOOL—Weight to Age

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	20	26	10	13	76
Junior First.......	20	23	12	14	86
Senior First.......	16	22	12	17	71
Junior Second.....	15	21	8	11	70
Senior Second.....	25	31	13	16	80
Junior Third......	20	24	12	14	82
Senior Third......	31	29	20	18	107
Junior Fourth.....	19	31	13	21	62
Senior Fourth.....	17	28	11	18	60
Totals........	183	26	111	16	694

Table 8

YORK STREET SCHOOL—Weight to Age

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	25	36	15	22	68
Junior First.......	5	16	4	12	31
Senior First.......	20	51	16	41	39
Junior Second.....	8	27	6	20	29
Senior Second.....	11	32	6	17	34
Junior Third......	14	35	7	17	40
Totals........	83	34	54	22	241

Table 9

MALNUTRITION—According to Grade in School

Grade	7% or more	Per cent.	10% or more	Per cent.	Total
Kindergarten......	146	47	96	31	307
Junior First.......	199	49	130	32	406
Senior First.......	137	53	92	35	256
Junior Second.....	104	46	60	26	226
Senior Second.....	141	41	81	24	339
Junior Third......	149	34	53	12	431
Senior Third......	179	47	108	28	379
Junior Fourth.....	118	43	69	25	271
Senior Fourth.....	69	34	32	16	200
Junior Fifth.......	11	57	8	42	19
Senior Fifth.......	3	33	2	22	9
Totals........	1256	44	731	26	2843

Table 10

Average Intelligence Quotient for 94 normal and overweight children—101 per cent.

Average Intelligence Quotient for 45 7% to 10% underweight children—101 per cent.

Average Intelligence Quotient for 104 10% or more underweight children—98 per cent.

DIPHTHERITIC ULCERATION OF THE SKIN

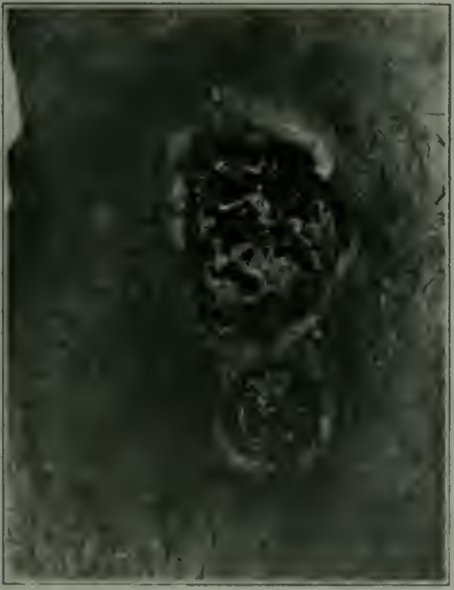
H. A. Dixon, M.B.
Toronto

PATIENT, P. W., aged twenty-five, entered hospital with deep ecthymatous ulcers on legs and adenitis in left groin.

Date of Admission. July 6th, 1918.

Previous Illness. Scabies, July, 1917.

History of Case. Four months previous to entering hospital. patient noticed pustules in the left lumbar area, also in the region of the knees and ankles and in the left inguinal furrow. The interesting feature was that one month previous to entering hospital, the pustules developed into ulcers, and, two weeks later, patient complained of a sensation of numbness in the shin bones.



Photograph of ulcers, left leg. Taken by Dr. C. P. Brown.

On Admission a large ulcer was present in the left inguinal furrow, also five ulcers inferior to the left knee and one pustular hair follicle on the anterior surface of the left ankle. Three ulcers were clustered about the right ankle.

Close Examination of the inguinal ulcer showed it to measure 4 cm. x 2.5 cm. with its long axis in the inguinal furrow. The surface was covered by a dark green, thick membrane which was firmly adherent to the base. Removal of a small piece of the membrane showed fine bleeding points. The margin was heaped up, slightly undermined, and surrounded by an angry indurated area. The other ulcers were smaller, round, and had a more punched-out appearance. The bases were covered with less adherent dark green slough.

Laboratory Findings. Smears from the largest ulcer showed bacillus diphtheriæ of the beaded type with metachromatic granules. Cultures were acid in glucose and dextrin—non acid in saccharose.

Animal Test. Guinea pig died in eight days with diphtheritic paralysis.

Nose and throat swabs from the patient were negative to diphtheria bacilli.

Culture from the pustule—left ankle—showed staphylococcus aureus.

Wassermann negative:

Urine—acid, specific gravity, 1,020; albumin negative, sugar negative, microscopic negative.

Examination of Nervous System. Pupils reacted to light and accommodation: knee jerks active on both sides.

Electrical Reaction in Legs. The responses to Faradism and Galvanism were brisk. The condensor results were normal except the extensor brevis digitorum which was ten times slower than normal. There was not any reaction of degeneration.

As this case occurred in the army, the history of infection is interesting.

Previous to patient's admission to hospital there had been much sickness in his battalion, chiefly of the type described as colds. Several of the men were sent to hospital as cases of diphtheria. His "sore legs" were dressed by the same attendants who looked after the other sick including the isolation cases. Apparently an original lesion had been secondarily infected with diphtheria bacilli from carriers or mild cases among those who were suffering from colds.

Treatment. Bichloride of mercury compresses were at first applied without any apparent change. The ulcers healed rapidly, however, following the use of diphtheria antitoxin and normal saline compresses.

I am indebted to Dr. Duncan Graham and Dr. C. P. Brown for the bacteriological findings; to Dr. E. P. Lewis for the electrical reactions.

OBSERVATIONS FROM THE DERMATOLOGICAL CLINIC OF THE DEPARTMENT OF SOLDIERS' CIVIL RE-ESTABLISHMENT OF CANADA, TORONTO BRANCH

D. King Smith, M.D.

Toronto

EARLY in the war the Dominion Government instituted the Department of Soldiers' Civil Re-establishment. An important branch is that of the Medical Service. Under this service in the large centres, clinics have been established in the various branches of medicine and surgery.

As a soldier is entitled for a year, from the date of his discharge from the army, to free medical attendance and treatment, the clinics are well patronized.

During the past seven months nearly three hundred patients have attended the clinic for diseases of the skin, which affords an opportunity to compare certain aspects of the diseases as met with in service and those in civilian practice.

While on active service in 1917 I made notes of my experience in diseases of the skin covering a period of two years. Some of the observations then made have been mentioned by various writers. Will discuss the subject under the various diseases.

Scabies. The cases were of an exceedingly severe type, characterized by marked pyogenic infection. Ecthymatous lesions were very common with a marked degree of ulceration. The ulcers were very resistant to treatment. The hands in a large percentage of the cases presented a severe dermatitis.

At present there are numerous severe cases, but the vast majority do not differ from those usually met with at a clinic.

Pediculosis. Very seldom seen now.

Pyogenic Infections. With the army impetigo contagiosa was very frequent and severe, although not differing from that seen in civilians.

Sycosis. This condition was fairly common, more so than in civilian practice. The vast majority of the cases were of a severe type and exceedingly resistant to treatment. All of the patients had a course of vaccine therapy, before being discharged from the army. The histories show that in a number of them improvement resulted for a while and then relapses followed.

The results of vaccine treatment have been disappointing. *X*-ray treatment has proved the most successful although quite a percentage, even under this treatment, has recurred. Patients suffering from sycosis often need careful constitutional treatment along with fresh air, and when once built up the response to the local treatment is most noticeable.

Pyogenic Dermatitis. The majority of these cases now coming under observation are due to discharging sinuses and wounds. Even after the sinuses and wounds have healed a chronic dermatitis remains. After months of careful treatment the dermatitis persists. This no doubt is due to the lowered vitality of the part affected. The condition is most frequently met with over the tibia.

In amputational cases, especially of the thigh, in many cases a dermatitis is present. I have ascribed it to the wearing of the amputational sock, as it necessarily has to be made of heavy wool and in many cases two socks have to be worn. Clinically the condition is similar to an intertrigo. No treatment is of value unless the artificial limb is discarded for a time.

Furunculosis. Very common in the returned man and often severe. In many cases the patients have suffered for a long period from a discharging wound. They are very susceptible to pus infection. The best results are obtained by building up the patient with tonics, good food and fresh air. Many of the cases failed to respond under local treatment and vaccines alone, but improved rapidly under good hygienic surroundings and tonics.

Diseases of So-called Nervous Origin. In 1917 I noted that the freedom from this class of disease was most astonishing. When one realizes the great nervous strain and exposure under which the troops were, it really is remarkable.

In hundreds of diseases of the skin I have only seen two cases of dermatitis herpetiformis, two or three of lichen planus and only two cases of alopecia areata.

Now that the war is over and the men have returned to the old mode of living, I find a great increase in these diseases. Out of the three hundred cases there have been twelve of dermatitis herpetiformis, lichen planus ten, and alopecia areata fifteen, a vast increase in percentage to those met with in service.

One case of lichen planus deserves special mention. Patient aged forty-six, while in charge of an elevator accidentally killed a man, a month after he developed a most severe attack, practically all of his body showing lesions. During the four weeks, from time of accident, he was greatly depressed, suffered from insomnia and could eat very little. Previous to the accident the man showed no nervous symptoms.

There is a peculiar nervous condition of many of the demobilized men. The chief symptoms are restlessness, insomnia and a slight tremor of hands. This nervous condition may be a predisposing factor and accounts in some degree for the increase of the diseases of so-called nervous origin.

I hardly think the percentage of these cases is larger than in a civilian clinic, but the contrast is marked to that of active service.

Pruritus. Many patients complain of a pruritus, especially of the abdomen and thighs. There are no lesions present except excoriations. As most men suffered from a prolonged seige of pediculosis while serving, I ascribe a large number of these cases to a mental impression.

Epidermophyton Infection. Is exceedingly common compared to pre-war days. This may partially be due to the fact that we are now better acquainted with the various phases of the diseases. As the cases under discussion were contracted in service it is reasonable to suppose that there must have been some predisposing causes or factors acting.

As the majority of cases showed the lesions in parts naturally most moist as the axillæ, inner sides of thighs and between the toes, I think the wearing of heavy underwear and heavy socks were very important factors in this infection.

Have had severe cases under observation in amputational cases of the thighs. The condition was kept up by reinfection from the amputational sock. After the socks were discarded, improvement rapidly took place.

During the warm weather last summer I had twenty-two cases of tinea cruris at clinic. They were of all grades of severity. The fungus was demonstrated in eight cases. As the weather became cooler a marked decrease of number of cases was noted and now as the weather is getting warmer the number of cases is increasing and some of the old cases are recurring. I think this course is the common experience in these cases.

Erythrasma. Eight cases have been under treatment at the clinic. In seven the lesions were confined to the inguinal region. One case presented many patches on chest, abdomen, arms, and legs.

Lopus Erythematosus. This condition has not been very commonly met with. At present have six cases under treatment.

Three of the patients state condition appeared soon after being exposed to mustard gas. Immediately on exposure face became swollen, inflamed and very painful. In one case while under my care showed an acute dermatitis of hands and forearms and a typical lupus erythematosus of face. Patient stated the condition of face and hands both began after exposure to the gas.

Am of the opinion that external irritation is a causative agent in many cases of lupus erythematosus. In the three cases mentioned the written histories of case state they followed gas exposure. Recently, in a private case, a lady was exposed to the sun and face was badly sunburnt, a marked lupus erythematosus developed.

Psoriasis. In my experience on active service the percentage of this disease compared to civilian practice was very small. The number of cases attending clinic now is fully equal to that of any out-door clinic.

Many men having psoriasis when enlisted improved greatly under the military training, and in many the condition completely disappeared only to relapse now that they have resumed, as in many cases, a sedentary life.

Unless a change to an out-door life is made in many cases of psoriasis the ordinary methods of treatment fail.

Recently I have had under treatment two very severe general cases of psoriasis, both of which resisted the usual treatment. Profiting from the experience in the army both were advised to go out into the woods or country and take lots of exercise. The advice was taken and the improvement was most marked.

Syphilis. The instruction which the men of the army received in this disease will prove most beneficial to the community in general. They appreciate the extreme seriousness of the disease and the results which may follow.

I have been impressed how on the slightest appearance of any skin lesion they present themselves at the clinic for examination and vary often come for a Wassermann test.

If somewhat similar methods of instructing the public could be adopted, it would go a long way to control the spread of this disease.

PRIMARY AND SECONDARY NITROUS OXIDE SATURATION FOR RELAXATION AND AS A TEST OF THE PATIENT'S CAPACITY FOR OPERATION

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General Considerations

In the primary, or induction, stage of nitrous oxide oxygen anæsthesia, it is the usual practice to administer 100 per cent. nitrous oxide to produce unconsciousness as soon as possible by a primary saturation of the blood with the anæsthetic gas. Very soon, however, a small amount of oxygen must be mixed with the nitrous oxide to prevent the jactitations and other manifestations of acute anoxæmia. Now, if some fixed proportion of oxygen is decided upon it will be found too small for some and too great for others, since patients differ in their mixture requirements. All of this is well known to gas-oxygen users. Preliminary or what may be called primary saturation with nitrous oxide is about as far as many gas-oxygen anæsthetics are carried. If the operation requires deeper relaxation it is the practice of many anæsthetists to resort either to a mixed gas-oxygen-ether, or to an ether sequence.

In a primary saturation only the actively circulating blood is saturated before oxygen must be administered. There remains in the muscles, and in all other tissues, considerable volumes of nitrogen and oxygen, which, in the early minutes of narcosis, enter the blood stream and dilute the nitrous oxide, thereby preventing deeper anæsthesia. In order to displace more of the non-anæsthetic gases in the body with nitrous oxide, the technic to be described as secondary saturation has been devised.

Any general anæsthetic relaxes muscle, providing some coincident by-product or effect does not counteract this function.

In nitrous oxide anæsthesia we may have sufficient anoxæmia to produce muscular spasm when there would have been relaxation had the anoxæmia been prevented. Yet by the usual technic it has not always been possible to prevent the anoxæmia and still have sufficient nitrous oxide concentration to relax the patient.

Clinical Observations.

Eleven or twelve years ago, in my early experience with gas-oxygen, occasionally patients were accidently overdosed with nitrous oxide, stopping respiration and requiring resuscitation with oxygen. I was impressed with the extreme ease and quickness of the restoration by inflating the lungs once or twice with oxygen. The phenomenon was so unusual when compared with the difficulties which followed overdosage with ether or chloroform that it made a profound impression.

In attempts to secure deep anæsthesia and muscular relaxation these observations became more commonplace and it was soon learned the cyanosis, a dilated pupil, and apnœa were easily corrected by inflating the lungs once or twice with

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oxygen, and that while these signs could not be disregarded nor neglected for a moment when they became apparent, nevertheless, the patient was in no serious danger if oxygen could be put into the lungs after saturation had occurred.

Another phenomenon was observed in this connection which has since been a most important means of securing a flacid abdominal wall When fully utilized it has made it possible to obtain for the patient the full advantage of a pure gas-oxygen anæsthesia, and to eliminate the unpleasant sequelæ which even a small amount of ether produces. The phenomenon was this: When the patient had been reoxygenated after saturation, complete muscular relaxation followed, and a patient who, prior to that time had been too rigid for easy abdominal exploration became ideal from the surgeon's point of view.

At first the fear of accident prevented the intentional utilization of this procedure in clinical practice and only in unintentional overdosing were further observations made. The patients were studied from many angles, careful records of pulse, respiration, blood pressures, pulmonary ventilation, rebreathing, and the mixture of gas-oxygen were tabulated on every patient during the narcosis, that an opportunity to study a case when one presented might not be lost.

These clinical observations of blood pressures unexpectedly exploded the theory that gas-oxygen elevated the blood pressure and, therefore, the danger from this factor was eliminated as early as 1911 and reported.

After three or four years observations of these occasional cases the conclusion was reached, that a patient might be crowded to the limit of saturation without great danger if oxygen could then be instantly forced into the lungs. The method was tried in those cases at first, in which ether was clearly contraindicated and in whom sufficient relaxation by the usual technic for pure gas-oxygen was not readily obtainable. Gradually its use has been extended to include *any* case in which relaxation of abdominal muscles is desired.

Many times the patient has been brought from what appears to be a well developed fourth stage with widely dilated fixed pupils, and deepest cyanosis, complete spastic apnœa, and general board-like rigidity, into a most beautiful placid relaxed pink patient in from ten to twenty seconds, with every appearance of normal slumber.

While this illustrates the remarkable flexibility of nitrous oxide and oxygen and its wonderful safety, it also illustrates the important clinical fact that a patient may be more completely saturated with nitrous oxide than has been generally practiced or thought possible.

THE PRINCIPLE OF NITROUS OXIDE SATURATION

The principle of nitrous oxide saturation is not radically different from ether or chloroform saturation, It requires, of course, a much higher concentration for a few moments than is required with the latter agents, and to secure this concentration, oxygen is temporarily cut off or markedly reduced below the proportion which will be administered after the saturation has been accomplished.

In most gas-oxygen anæsthesias as given in the past, the patients have been only partly saturated, and reflexes or rigid muscles resulted just as occurs under light anæsthesia with ether, chloroform, or other general anæsthetic.

The extraction specialists of years ago and today produce primary saturation and approach secondary saturation in many of their muscular patients before beginning to extract teeth. Had they required the relaxation needed in abdominal surgery, and possessed the means for using oxygen which we have, the technic for secondary saturation, no doubt would have been developed by them, because they were not afraid of cyanosis, which is the stumbling block in the minds of ether or chloroform trained anæsthetists and surgeons. The extractionist soon learns that nitrous oxide (without oxygen) usually produces anæsthesia slightly later than the onset of cyanosis and he, therefore, rarely removes the inhaler until his patient is fairly blue. Yet under such a technic with all sorts of patients he has established a record for safety with nitrous oxide which has not been approached by any other anæsthetic agent.

The fear of cyanosis by the surgeon and anæsthetist has been one of the most powerful influences in holding back the progress of nitrous oxide and oxygen. It is the most natural thing to administer oxygen when the skin becomes dusky, and stop the further development of narcosis by so doing. General ignorance concerning the signifiance of cyanosis itself and how much cyanosis from a certain cause will be tolerated for certain periods of time, are subjects worthy of investigation. Cyanosis as a sign indicating the depth of anæsthesia, is not only absolutely valueless but misleading and dangerous *because one patient may be cyanotic and still conscious, while another may be pink, overdosed and dying from the same mixture of nitrous oxide and oxygen.*

ILLUSTRATIVE CASE REPORT

The following unusual and remarkable case in my recent experience illustrates: Mrs. C., a middle aged woman had twelve infected teeth to be removed. She had had four or five blood transfusions, one recently, for an anæmia of four years' standing. The hæmoglobin index was 27 cent. and the red cell count 2,250,000. She was excitable, weak, and spent much of her time in bed. Nitrous oxide-oxygen was selected by the consultants as the safest anæsthetic for this patient. The usual technic of induction with 100 per cent. nitrous oxide was begun, January 5th, 1920, but at the end of the third inhalation while the ear and nails were distinctly pink (they had been previously quite pale) respiration stopped, the eyelids opened, and the pupils had dilated until only a narrow ring of iris could be seen. The muscles were completely *relaxed* in every part of the body. The pulse was weak but regular and easily felt.

The lungs were promptly inflated or about half filled with oxygen twice, and within ten seconds the iris began to retract and within a few more seconds respirations resumed regularly.

On account of the few breaths required to thus overdose the patient, it was evident that the nitrous oxide would need to be highly diluted with oxygen to prevent a recurrence and, therefore, the apparatus was set for 30 per cent. oxygen and only 70 per cent. nitrous oxide. But the same signs recurred within five or six breaths, and again she was resuscitated with two inflations of oxygen. Now, 50 per cent. oxygen and 50 per cent. nitrous oxide were administered and after several breaths the pupils began to slowly dilate and respirations became weaker. After a breath of 100 per cent. oxygen was administered, to prevent the further development of over dosage, 40 per cent. oxide was next tried with 60 per cent. oxygen. This proved to be the ideal mixture for the patient and no further difficulty was experienced, while the operation proceeded.

The operation lasted twenty minutes in which the teeth were removed, the alveolar process trimmed smooth with rongeurs, the gum margin trimmed and sutured so as to restore mastication by artificial dentures within a few days.

Semi-consciousness following the operation lasted for thirty minutes (instead of a few seconds) which was no doubt due to her unusually weak condition and to her anæmia. There has been a gradual improvement in the general condition of the patient up to the present time.

Besides illustrating the fact that a patient may be overdosed with very low percentage of nitrous oxide without showing cyanosis, this extreme case emphasizes the importance of the true signs of anæsthesia as a guide to the anæsthetist, and the necessity for being prepared to resuscitate a patient when respirations are accidently stopped by over saturation with nitrous oxide, regardless of the proportion of oxygen which may have been used up to this time. Another unusual but expected phenomemon occurred in this case, the moment when overdosage occurred each time, as well as at other times, there was no muscular rigidity, but extreme relaxation instead. This was due to the fact that we had the nitrous oxide in sufficient concentration to produce relaxation and also enough oxygen to prevent anoxæmic spasticity. At no time was there anoxæmia of cyanosis to produce spacticity. In the usual case when saturation is first attained the coincident anoxæmia causes the muscles to become board-like or spastic, but relaxation comes promptly when sufficient oxygen is restored to them.

PRIMARY AND SECONDARY CYANOSIS

Cyanosis may be classified as primary and secondary; primary due to changes in the blood itself, and secondary due to local or external causes capable of increasing the oxygen depletion of the blood. Cyanosis is due to the deoxidation of oxyhæmoglobin to reduce hæmoglobin, it is a physiological process carried beyond the usual limits.

Blood usually leaves the lungs about 95 per cent. saturated with oxygen, therefore having only 5 per cent. unsaturated. There will be a larger portion of it unsaturated if æration is interfered with by inspired mucous, by blood, a restricted airway, or by a reduction of the oxygen administered as in anæsthesia.

That cyanosis *per se* is not incompatible with life is illustrated in morbus cæruleus, aviation, pneumonia, and in bathers exposed to cold air.

In old age when metabolism is lower, less oxygen is consumed in the tissues, and less cyanosis results from oxygen restriction. The old folks are usually ideal patients for gas-oxygen, easily handled and rarely requiring secondary saturation to produce relaxation. The young adult on a similar oxygen percentage in the anæsthetic mixture usually shows a greater unsaturation and more cyanosis.

The rate of flow of the blood may be altered so as to increase unsaturation or cyanosis in terminal toxæmias such as in peritonitis or endocarditis, or again from a deficient septum between the ventricles.

Then the blood itself greatly influences cyanosis. The anæmic patient in a given mixture of nitrous oxide and oxygen, producing normal anæsthesia, obtains enough oxygen to oxidize the small quantity of hæmoglobin she carries, while the full blooded drayman on the same mixture would probably be cyanotic because the oxygen would be sufficient only to oxidize 50 to 75 per cent. of his hæmoglobin.

In well marked anæmia with less than a 50 per cent. hæmoglobin index cyanosis is rarely seen; with an index of 30 per cent. or less cyanosis cannot be produced before death.

It is, therefore, obvious that the fear of cyanosis is sometimes well founded and at other times unwarranted. Its absence, however, is not a sign of safety.

Under ether or chloroform, cyanosis is usually a serious omen—an indication of serious heart embarrassment, or restricted respiration from over dosage. It is not usually due to a restriction of oxygen administered or inhaled.

In thousands of administrations degrees of cyanosis have been produced for variable lengths of time under nitrous oxide with no ill effects, which, if seen under chloroform or ether, would, in a fair percentage of cases, result fatally. *The difference is in the cause.*

In operative cases one must be able to determine the cause of cyanosis, if it occurs, and whether it is controllable or not, before concluding that it is detrimental. Some patients will tolerate quite deep cyanosis for a few minutes, a moderate amount for hours and a slight cyanosis for long periods if due merely to a restriction of oxygen administered to the lungs for absorption.

The Signs of Anæsthesia

The only true signs of anæsthesia clinically, which are of value, are those manifested through the patient's muscular system. Movement, or its absence is significant. In the accompanying table colour is tabulated principally to show its uselessness as a guide to counteract the often repeated statements in anæsthetic literature regarding its supposed value.

The third stage of anæsthesia as described in the text-books, is here divided into three planes: *light, normal, and profound.* The third plane or profound anæsthesia, borders upon the fourth stage and merges into it with the (d) group of signs. The signs of the third plane are the guides to secondary saturation, as well as the limits of anoxæmia, which are momentarily permissible in producing secondary saturation.

The Technic of Usual Induction, or Primary Saturation

Anæsthesia is induced by administering 100 per cent. nitrous oxide until the first muscular phenomenon of oxygen hunger is observed. This may be and usually is characterized by a change in character or rate of respiration accompanied by a little snore, a twitch of the eyelid, a jerk of the hand or foot, or some similar anoxæmic muscular contraction, clonic in character.

This is the patient's first signal for oxygen, and marks the moment when oxygen should be added to the nitrous oxide in sufficient proportions or percentage to prevent, temporarily, the further development of anoxæmia. What this percentage of oxygen shall be is determined by the susceptibility of the patient, which is roughly determined by the length of time or the number of breaths of pure nitrous oxide which the patient has inhaled, before anoxæmia develops. If short the percentage of oxygen may be greater than if anoxæmia comes on slowly. But in the usual case, with the first anoxæmic sign, 5 to 6 per cent. oxygen is then mixed with the nitrous oxide, increasing or diminishing it as the signs of anæsthesia may indicate while attempting to attain the normal plane of anæsthesia. Thus, the first two or three minutes of narcosis will pass before it will be determined whether the normal plane can be secured without secondary saturation or not, whether it will be necessary to further saturate with nitrous oxide in order to rob the tissues of their excess of oxygen and nitrogen, and thus prepare for muscular relaxation by increasing the amount of nitrous oxide in the body.

Technic of Secondary Saturation

If relaxation has not taken place when other signs indicate that the patient is in normal anæsthesia and if relaxation is essential to the success

LIGHT ANÆSTHESIA	NORMAL ANÆSTHESIA	PROFOUND ANÆSTHESIA
Due to too much oxygen in the mixture.	Due to a properly balanced mixture of N2O-O.	Due to too much N20 in the mixture or to partial obstruction of respiratory passages.
RESPIRATION	RESPIRATION	RESPIRATION
(a) Superficial slow breathing usually regular. (b) Prolonged inspiration. (c) Phonation due to reflexes or pain. (d) Holding breath, grunting.	(a) Full "machine like" respirations. Regular and faster than normal. (b) Inspiration and expiration nearly equal. (c) No phonation. (d) Continuous uninterrupted respiration.	(a) Irregular rhythm (sobby) usually slower than normal. Spasmodic. (b) Prolonged expiration. (c) Phonation due to muscular spasm of vocal cords. Often crowing. (d) Cessation of respiration from spasm of muscles of exhalation.
MUSCULAR PHENOMENA	MUSCULAR PHENOMENA	MUSCULAR PHENOMENA
(a) Movements or rigid muscles. (b) Facial expression of pain or consciousness. (c) Nausea, very rarely. (d) Reflex, or voluntarily resistance.	(a) Immobile and relaxed, but having normal muscular tonus. (b) Expression of normal sleep. (c) Quiet. (d) Quiet. Relaxed.	(a) Clonic movements, twitching or jerking in early minutes of induction, often start in upper eyelids. (b) Expression wild looking. (c) Swallowing, retching or vomiting, common. (d) Tetanic, spasm, marked rigidity—opisthotonus in some cases.
THE EYE	THE EYE	THE EYE
(a) Pupils large, contract to light actively. (b) Conjunctive sensitive. (c) Eyeballs roll. (d) Eyelids resist opening, winks when touched.	(a) Pupils small or medium fixed. (b) Conjunctive insensitive to touch. (c) Eyeballs fixed or slowly roll. (d) Lids often slightly open, relaxed, no winking.	(a) Pupils fixed, enlarge progressively and finally become irregular in shape. (b) Conjunctive insensitive. (c) Eyeballs fixed in some position or jerk. (d) Eyelids stiff. Often wide open.
COLOUR IN SKIN	COLOUR IN SKIN	COLOUR IN SKIN
(a) Pink or no change normally. (b) In anæmics, no colour change. (c) In plethorics, slight cyanosis.	(a) Varies from pink to decided cyanotic tint. (b) In anæmics, no colour change. (c) In plethorics, considerable cyanosis.	(a) Usually cyanotic. (b) In anæmics, slight flushing, rarely cyanosis. (c) In plethorics, almost black.
REMEDY		REMEDY
Decrease the percentage of oxygen in the mixture.		Increase oxygen in the mixture or in (d) inflate lungs with pure oxygen 1 to 3 times.

of the operation, see that plenty of oxygen is available, and know by previous trial upon yourself that the apparatus will actually inflate the lungs with pure oxygen, then proceed to secondary saturation as follows:

A. Deoxygenation. Reduce the proportion of oxygen or administer 100 per cent. nitrous oxide until the pupils dilate (beware of glass eyes and adherent iris), tonic muscular spasm or rigidity develops, respiration becomes slow or stops. These are the signs of the profound plane of anæsthesia.

B. Reoxygenation. Then administer one breath of 75 to 100 per cent. oxygen, if the patient inhales, if he does not, partly fill the lungs by inflating with pure oxygen once or twice—usually once is sufficient. The cyanotic colour now begins to lighten, if present, the pupils retract, the pulse is normal or slower than before, the muscles become perfectly relaxed and respirations resume.

If care is taken not to administer too much oxygen or too many breaths of oxygen, which will in itself desaturate, the period of relaxation may last throughout the operation, or it may be necessary to resaturate if air leaks into the respiratory channels of the apparatus, and thus displaces the nitrous oxide with an excess of nitrogen and oxygen.

There are good reasons for believing that air is slowly but sufficiently absorbed through the skin and open abdomen to destroy the nitrous oxide saturation, in some cases, necessitating resaturation at the time of closing the abdominal wound. At this time another advantage may be taken of the procedure to immobilize the abdomen for a few seconds while closing the peritoneum.

After reoxygenation of secondary saturation is begun there are from 5 to 20 seconds when the patient does not breathe because of the excess of oxygen in the blood and brain, and if this phase of secondary saturation is properly timed it not only gives the surgeon a perfectly flacid abdominal wall, but also a quiet peritoneum to sew.

Test for Patient's Capacity for Operation

We are occasionally asked to anæsthetize patients who may be regarded generally as inoperable. Without the operation death may be *inevitable* and with it, *probable*. If the patient is unable to withstand the burden of beginning narcosis, the operation ordinarily must be abandoned forthwith. But how may we more surely determine that the patient will succumb during or immediately after the operation? How can we avoid the hopeless cases, without abandoning any who might be cured? The answer to these questions is difficult and depends upon many factors beside the resistance of the patient:—Duration and character of operation; the surgeon, the anæsthetist, the anæsthetic, and the use of other agents calculated to prolong life. It is a delicate situation in which any one member in the team may cause disaster on the table; and in which the most intelligent co-operation of all may not avoid it.

You cannot tell by the looks of a frog how far he can jump, nor will mere inspection, however valuable, give more than a vague prognosis.

The pulse may not be extreme in rate and the blood pressure may be shamming. The real question is, how much reserve have we to draw upon, or will a slight interference break the delicate balance of pulse, blood pressure, and respiratory relations, and initiate an immediate demise?

Illustrative Case

Several years ago I was called into the country to anæsthetize a farmer who had had a strangulated hernia for several days, and was apparently very near death. After carrying him from the bed to the kitchen table he had to be resuscitated with oxygen. I did a primary saturation with gas-oxygen and was compelled to again resuscitate with oxygen, which was easily accomplished. The surgeon then suggested that we try ether on the supposition that ether is a stimulant even in anæsthetic dosage. A few drops were administered and after fifteen minutes work with oxygen the patient was sufficiently resuscitated to be put to bed without the operation. The patient died four hours later. We concluded that this patient was inoperable.

Blood Pressure Guides

When a normal pulse rate is reduced the blood pressures normally fall from 25 to 50 per cent. of the difference in pulse rate, and conversely when the pulse rate increases the blood pressures rise. A patient who has a pulse rate of 120 or over may develop a slower heart beat under anæsthesia with a slightly increased blood pressure or the pressures may remain stationary while the pulse becomes slower. Such a condition is of good omen and not an indication of circulatory depression. When changes in pulse rate are not accompanied by the above changes in blood pressure we have some degree of circulatory depression.

Primary and secondary saturation at one phase increases the pulse rate and immediately following decreases the pulse rate and blood pressures. When the oxygen reaches the blood stream a moment later the pulse and blood pressures return immediately to their former readings. This is the normal response to saturation and reoxygenation.

Now in the moribund case we usually have circulatory depression of a more or less serious degree to begin with, and the effects of primary saturation followed by a breath or two of oxygen may show an increased circulatory depression lasting for three to five minutes, which contraindicates any but extremely short and simple operative procedures.

In the class of cases under discussion, requiring an abdominal or other *major* operation, a deeper test is needed to determine the reserve or power of compensation which the patient must have to go through the procedure. For this, I have many times resorted to first primary and then secondary saturation, noting the effect on the pulse and blood pressure relations for three to five minutes after the oxygen is administered. If the pulse is increased as much as 25 per cent. and the blood pressures decreased 25 per cent. or more (second degree depression) and the patient, while inhaling oxygen, is unable to compensate within five minutes, he may be regarded as absolutely inoperable for major surgery, in the hand of the best organization of anæsthetist, surgeon and assistants.

The personal factor enters in saying "yes" or "no" to a proposed operation. Patients are being shocked to death every day who would easily pass the above test. The anæsthetist must properly rate himself as well as the surgeon, assistants and patient, denying none who might live if operated and refusing all who will die while being operated.

I have had no deaths or serious scares as a result of either primary or secondary saturation.

CONCLUSIONS

1. Primary saturation of the patient with nitrous oxide fails in some cases to produce sufficient relaxation for certain operations.

2. Nitrous oxide produces muscular relaxation when it is sufficiently concentrated in the tissues and associated with enough oxygen to prevent anoxæmic rigidity. High concentration of this gas in the tissues is required to displace the non-anæsthetic diluting gases.

3. The technic of secondary saturation which I have described and used extensively for several years, intensifies nitrous oxide anæsthesia and produces sufficient relaxation for any operation.

4. Secondary saturation is readily lost by subsequent errors in the mixture administered, leaks of air into the patient's air passages and probably by absorption of air through the abdominal cavity and skin, requiring occasional resaturation in some cases.

5. Its successful and safe employment depends upon an apparatus capable of inflating the lungs with oxygen should the patient be crowded, intentionally or accidentally, into spastic apnœa. It depends also upon an accurate interpretation of the signs of anæsthesia, but disregarding the the presence of absence of cyanosis as an anæsthetic sign.

6. Secondary saturation has been followed by no post-anæsthetic sequelæ which may be attributed to its use. I believe it is safer for the patient than an ether sequence, or combined gas-oxygen-ether, and convalesence is decidedly better, when even the small amount of ether, which is employed to relax muscles, is avoided in the narcosis.

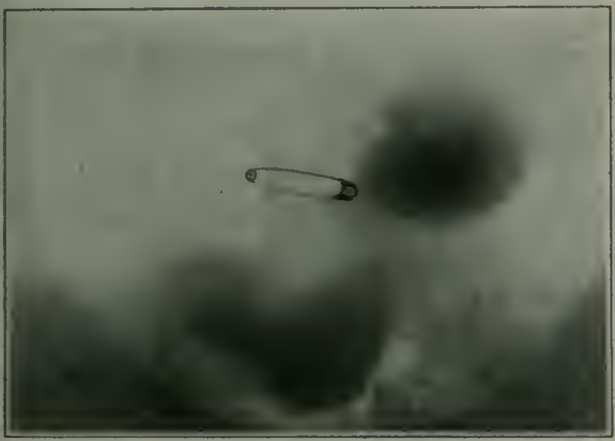
7. Primary and secondary saturation, in their relation to the pulse, and blood pressure ratios, make a valuable and safe test if operability in doubtful and moribund cases.

Case Report

AN UNUSUAL ABDOMINAL CONDITION COMPLICATING HOUR-GLASS STOMACH

W. A. Lincoln, M.D., F.A.C.S., F.R.C.S. (Eng.)
Calgary

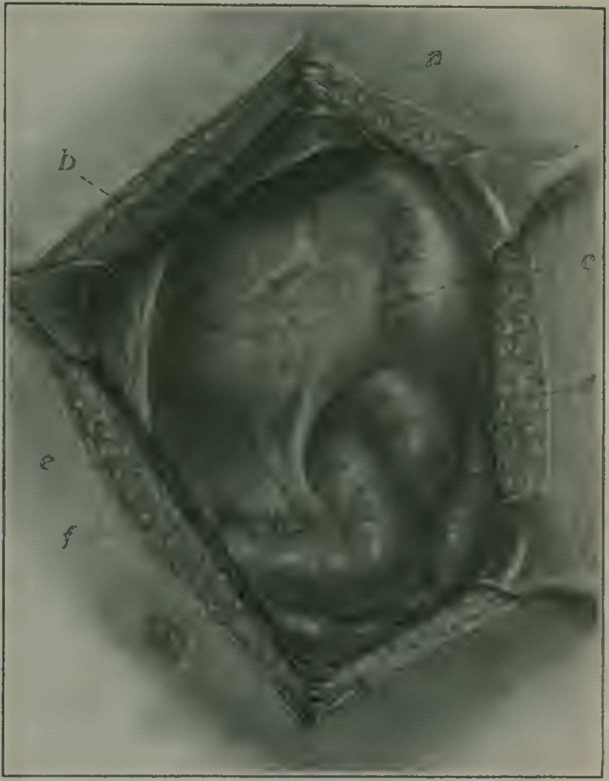
Personal and Family History. Patient No. 2076, Mrs. N., age forty-six, married, six children. No special difficulty; apart from her stomach trouble, has had no severe illness.



Two Hours After Bismuth Meal Showing Both Pouches

History of Present Illness. Ever since a girl she has had "stomach trouble" and was then told that she had a gastric ulcer. This was characterized by attacks of pain and discomfort coming on about two hours after taking food and relieved by her next meal. She was quite free from pain between the attacks, which at first came at rather long intervals. Latterly the trouble was more continuous and commenced very soon after taking food and was only relieved by vomiting. Vomiting has only been present during the last six months and is often of large amounts and contains food taken some time previously. She has never vomited blood or passed blood, by the bowels. Meat or solid food causes much more distress, and she now practically lives on milk or other easily assimilated food. She has lost twenty pounds in weight during the last two months. Gastric analysis shows an increased amount of contents, with a total acidity of sixteen and no hydrochloric acid. *X*-ray shows an hour-glass condition of the stomach with two pouches a considerable distance apart. The lower one situated in the pelvis. The first pouch takes three hours to empty and the lower one, eight to ten hours. Blood examination: leucocytes 8,600; red blood cells, 4,125,000; hæmoglobin, 80. Patient is a small, very poorly nourished woman. Abdomen much relaxed and full in the lower quadrants. Physical examination of the various organs reveals no abnormality.

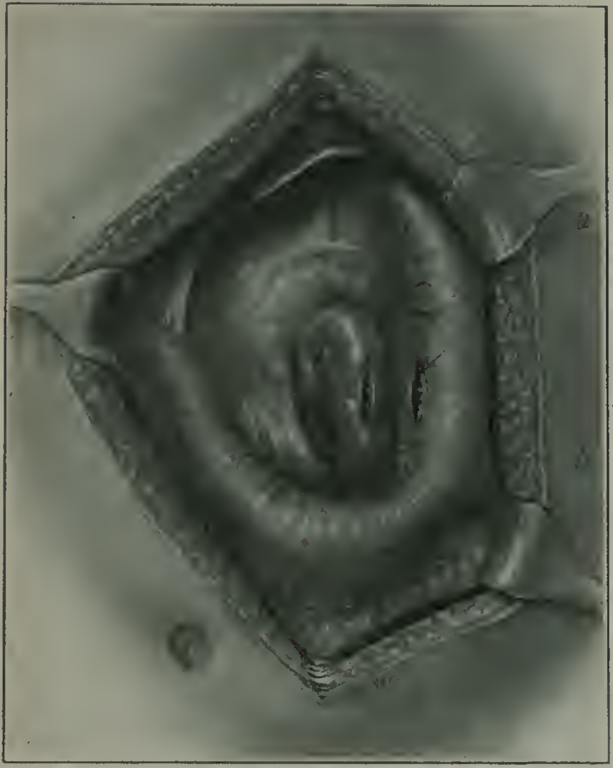
Operation. On opening the abdomen with the



Appearance on Opening the Abdomen

(*a*) Liver, (*b*) Pancreas. (*c*) Stomach, (*d*) Ileum, (*e*) Root of Messentery, (*f*) Jejunum.

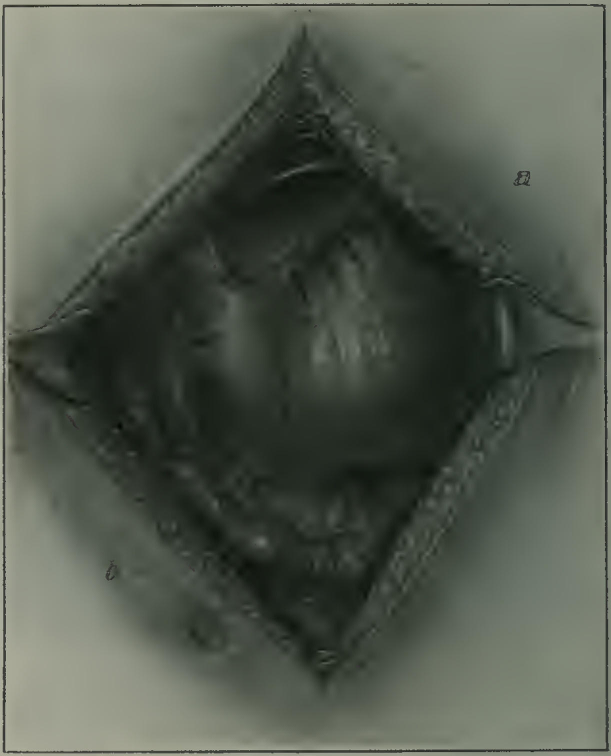
Read at the fifty-first annual meeting of The Canadian Medical Association, Vancouver, June 24th, 1920.



Appearance When Bowels are Replaced and Prepared for Gastro-enterostomy

(*a*) Incision in Jejunum and Stomach for Gastro-enterostomy.
(*b*) Healed Ulcer of Stomach.

ordinary high incision, no stomach, transverse colon, or omentum were seen. The pancreas, root of jejunum and small bowel presented. Examination revealed the fact that the stomach and transverse colon had dropped, and the whole small bowel had herniated through the transverse meso-colon into the lesser sac and again through the gastro-hepatic omentum, so that the stomach and transverse colon were pushed down into the pelvis and to the back, the small intestines filling the central and upper portions of the abdomen. These were replaced and an anastomosis made between the proximal pouch of the stomach and the first part of the jejunum near its origin. The opening in the transverse meso-colon was closed and the distal pouch of the stomach attached to the proximal pouch thus obliterating the opening and preventing any possibility of a recurrence. Patient made an uneventful recovery and has since gained twenty-five or thirty pounds in weight. She is able to take a full and varied diet with no discomfort or symptoms referable to the stomach.



Appearance When Operation is Completed

(*a*) Two parts of Stomach Sutured Covering Opening in Transverse Mesocolon.
(*b*) Transverse Colon.

The fifteenth semi-annual meeting of the Canadian Association of Clinical Surgeons was held in Montreal on January 8th, 1921. Dr. J. A. Hutchison presided.

In the morning the members met at the Royal Victoria Hospital where an interesting series of cases were presented by the members of the hospital staff.

In the afternoon the meeting was held at the Montreal General Hospital where pathological specimens and living cases were shown. Many of these specimens and cases were of the greatest interest. Special mention could be made of Dr. Rabinovitch's demonstration of the prognostic value of the study of the blood chemistry of the acute abdomen.

In the evening the Montreal members entertained the visiting members at dinner during which the business meeting was held.

Doctor George Bingham of Toronto was unanimously elected President for the next meeting which will take place in Toronto in May.

Editorial

THE DEVELOPMENT OF NEUROLOGICAL SURGERY

IT is perhaps not too much to say that neurological surgery during the past twenty years has contributed to the advance of our ability to diagnose lesions of the central nervous system more than the pathological post-mortem work of many years previous was able to accomplish. The internist, while mildly sceptical, or even good-humouredly vituperative, in his remarks concerning the therapeutical results of the surgeon, has been glad enough to see with his eye what might be actually present in a given case, and to accept the information as a future guide. The results of surgical treatment as to cure in case of brain and cord tumours, epilepsy, severe cerebral injuries, and other lesions carrying a *prognosis infausta*, were at first thoroughly discouraging, and still remain somewhat depressing; but it can be said on the other side that improvement in this respect has in the last ten years been enormous. To take merely one instance; the removal of the Gasserian ganglion for that most agonizing of all maladies, tic douloureux, carried with it at first a mortality of 20 to 30 per cent. Through the work of Harvey Cushing and of Frazier, that has now been so reduced that the operation has become little more dangerous than a simple appendicitis, and less dangerous than that of a perforated appendix. Cushing has at present a series of over three hundred "gasserectomies" without a death.

Where cure is impossible, on the other hand, surgery is frequently able to afford great relief to headache and to save sight.

There was held recently in Boston the second meeting of the Society of Neurological Surgeons, numbering some twenty members. The work shown and the discussion of live subjects in this domain, abundantly proved the necessity for the formation of an Association of such specialized workers. It is only by open discussion between experts, meaning men possessed of unusual experience, that progress along new lines can be most rapidly developed. And the tendency to specialize in this branch of surgery, as evidenced by the quite considerable number of members, was to the unprejudiced observer thoroughly justified by the scientific character of the contributions. The new work of Dandy upon the causes of hydrocephalus and upon the graphic demonstration of the cerebral ventricules in *x*-ray pictures by the injection of air was reviewed. It was pointed out that the method was not without some danger, unless very carefully carried out by an expert. Even then it was occasionally followed by symptoms of cerebral compression severe enough to cause anxiety, and even alarm.

The question of intravenous injection of saturated salt solution with the object of reducing the amount of fluid in the ventricles in cases of hydrocephalus with headache was reported on; and the experience of certain of the members was to the effect that in the majority of instances there could be obtained by this method the withdrawal of a considerable amount of ventricular fluid into the blood, presumably by osmosis, with resulting relief of pressure symptoms; but that the effect was usually transitory. Experimental work was being done in the matter by Sachs, of St. Louis, who made a short preliminary communication.

There is no need in this place to review the work of the meeting in detail. But it seemed to the writer that the establishment of a society of this nature, marking, as it did, the growth of interest and of success in a branch of surgical work to which only a few years ago not more than two or three men in the world were devoting all their time, and which was generally considered a nearly hopeless field, was worthy not only of comment but also of sympathetic encouragement.

THE ACUTE ABDOMEN

IN this issue of the Journal there appear a number of papers concerned with various aspects of what is nowadays called the "acute abdomen". Those who aspire to a decent style in writing, but who cannot find the necessary time, always put this phrase in quotation marks, by way of notifying the reader that they disclaim all responsibility for it, and to indicate, in fact, that they consider it an ellipse to be deprecated. Yet they are forced to use it, because it is convenient, and very expressive.

There is nothing particularly new in these papers, but they are none the less useful, in that they bring forcibly to the attention of the general practitioner the necessity of giving very serious consideration to each case that presents acute symptoms in the abdominal region. A good deal has been written in the last few years on this subject, particularly by Deaver, of Philadelphia. And this is well, because we learn by iteration. The lesson must be conned o'er and o'er. And, in the present matter particularly, the medical man cannot be too often reminded of the necessity of accurate diagnosis and early treatment. It is by much writing of this sort in many medical journals throughout the country during the last thirty years that cases of appendiceal abscess and of general peritonitis are now becoming in hospital practice so much less frequent than they were years ago. Yet is there room for improvement. There still appear in our hospitals too great a number of patients sent in by the general practitioner, at so late a stage that the patient's chance of life, and his physician's reputation, are equally endangered. We hope that the series of practical articles which we publish this month will inspire in the minds of the profession throughout Canada a proper fear of the "acute abdomen" and a greater promptitude in the calling of a competent surgeon in consultation.

It is true that in the present day one expects from the general practitioner, who is driven to death in looking after the minor illnesses of life, a wider range of reading and a more extensive knowledge of disease than it is possible for him either to do or to acquire. But this subject at least is so important, and carries with it such grave responsibility for the life of his patient, that he ought to consider it his duty to devote time to its study. It ranks in seriousness to take merely one instance, with the graver complications of midwifery. This simile will doubtless carry its proper appeal.

NEWER IDEAS IN THE TREATMENT OF DIABETES MELLITUS

IN a recent issue Newburgh and Marsh bring before the profession the general principles underlying the treatment of diabetes mellitus. It is generally admitted by those who have had an extensive experience with the treatment of this disease by Allen's methods that there are a certain number of severe cases, especially in children, where the procedure has been a failure. This has been largely due to their inability to build up a mixed tolerance high enough to maintain a nitrogen equilibrium, and at the same time to control the hyperglycemia; the result has been that the individuals progress to a fatal termination by slow starvation. Recently Allen has laid great stress upon the importance of a restricted fat intake which in many cases has necessitated insufficient calories. Again through his experimental work he attempts to show "a quantitative relation between the internal pancreatic function and the total body weight and metabolism."

Newburgh and Marsh, through a study of seventy-three cases of diabetes mellitus, have come to the conclusion that many severe cases can be returned to a useful and productive life by the use of a high fat, low protein, low carbohydrate diet. The protein element is correctly based upon Hindhede's observation that less than 0·66 grams of protein per kilogram of body weight will maintain nitrogen equilibrium provided enough calories are supplied from other sources. Their published facts show that the glycosuria is controlled in severe cases, that the hyperglycemia is lowered, that an acidosis is not precipitated, and when present rapidly clears up, and that the nitrogen equilibrium can be maintained. It is an important observation that an acidosis of moderate grade will disappear when the body is called upon to burn as high as four to five molecules of fat for each molecule of carbohydrate: Also the fact that these high fat diets react favourably upon a hyperglycemia is worthy of consideration. It would be instructive to know more about the total blood fat and its partition in such diets, as this subject was not touched upon in their work. The ultimate outcome of a high fat, low protein, low carbohydrate regime for diabetic patients time only will tell, but the favourable state of health of the reported severe cases several months after discharge is striking.

The Association

REPORT OF EDUCATION COMMITTEE AT THE VANCOUVER MEETING.

June 1920

THE following resolutions were referred to the Committe on Medical Education at the Quebec Meeting:

1. "That the Committee on Medical Education be instructed to investigate the possibility of providing University Extension Post-Graduate Courses for members of the profession in various local societies, and to report on the question at the next meeting of the Association."

2. "That the Canadian Medical Association recommend that medical men who at the outbreak of the war were registered practitioners in any province of the Dominion and who gave up their practice in order to join the C.E.F. or other branches of the Imperial or Allied Armies; also all graduates of our Medical Schools in Canada, of the year 1914 to 1918 inclusive, who served in the O.M.F.C., or in the British Army or Navy, or Allied Forces, shall be elegible for registration in the register of the Dominion Medical Council without examination, provided always that the record of such service has been satisfactory."

Resolutions

Your committee is pleased to report that practically all the universities have agreed to cooperate in arranging port-graduate courses.

Your committee is of the opinion that lectures to County Societies by university men or others are of little enduring value. The call at the present time is for clinical work, and your committee recommends that the universities be asked to provide annually, short intensive courses, specially arranged to meet the needs of the general practitioner. Your committee would further recommend that the larger sanatoria in the Dominion be encouraged to establish clinics for the study of tuberculosis.

In regard to the second resolution your committee, while in entire sympathy with the wishes expressed, is unable to make any recommendation since it has been advised by the solicitor of the Medical Council of Canada, through its chief executive officer, that the said Council has no power to grant standing in any other way than by the regular examinations.

Census

There are 11,202 practitioners registered in Canada. Of this number approximately one thousand are not in active practice. There are 250 women doctors. The following table shows the census according to the latest available figures.

Province	*Proctitioners*	*Population*
British Columbia......	790	450,000
Alberta..............	600	500,000
Saskatchewan.........	463	492,432
Manitoba.............	519	553,860
*Ontario.............	5,743	2,523,274
Quebec...............	2,000	2,003,232
Nova Scotia..........	751	826,100
Prince Edward Island..	77	83,728
New Brunswick........	259	351,859

It would appear that Ontario with its relatively large urban population is over stocked.

The Six Year Medical Course

So far as your committee has been able to learn, only a small percentage, no more than 10 to 15 per cent. of the Canadian profession supports the six year academic course, as at present adopted by the majority of the universities of Canada.

Criticisms and Suggestions

1. The universities acted with unseemly haste in adopting the six year course without giving the five year course a fair and adequate trial.

2. A higher standard of entrance, a course of reasonable length, say five years, and greater facility for post-graduate work would have yield-

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*Of the 5743 practitioners on the Ontario Register, only 3460 are in actual practice.

ed better results for the Canadian people than the straight six year academic course.

3. Too much stress is being laid, in some of our universities, on the importance of laboratory work. Instrumental methods are of value, but very rarely should a diagnosis rest on instrumental methods alone. Mechanical devices of proven worth should be employed but always as a means of training the senses, never as a substitute for them. The heart and arteries may give more information as to the nature and extent of a kidney affection than the most elaborate chemical and microscopic examinations; the latter should never be neglected, but let them be assigned their proper place.

Danger Signals

1. There is a danger of too much centralization of authority, and of too much reverence for the fetish of standardization by laymen and others, who however interested, are not really in vital touch with the practical side of medical education in this country.

2. Certain organizations are proclaiming loudly that the medical profession is a close corporation, and that there is now no hope for any but the sons and daughters of the rich to qualify. Is there any justification for this charge?

3. It appears inimical to the highest interests and future welfare of our country, that any foreign organization, with unlimited means at its disposal, should be permitted, without government or other supervision, to inspect our institutions, standardize, in accordance with a foreign standard, our medical courses, and otherwise influence the life and policy of our universities.

Surely we require a more intense national spirit, a greater measure of self-respect, and an unswerving determination that, come what will, the plants that are allowed to take root in this country, must conform to Canadian ideals and must be permitted to develop undisturbed, for the benefit of the Canadian people.

All of which is respectfully submitted,

(Sgd.) Jas. Third,
Chairman

Kingston, Ont.

June, 14th 1920.

Correspondence

DICTIONARY OF ALTITUDES IN CANADA

To the Editor:

It may not be generally known among your readers that the Commission of Conservation has a publication, *Dictionary of Altitudes in Canada*, a cloth-bound volume, which may be obtained by medical men free upon request.

With the movement of population from one portion of Canada to another, it is of importance that medical practitioners be in a position to advise as to the possible effect upon the health of patients of change of residence to new localities, especially of higher altitude.

Recording, as it does, the altitude of all places of importance in Canada, the Dictionary of Altitudes should be valuable as a reference volume to medical men.

If you would kindly transmit this information to your readers, it would be appreciated.

Yours faithfully,

James White
Deputy Head

Ottawa,

December 24th, 1920

Retrospect

THE ÆTIOLOGY AND PROPHYLAXIS OF SIMPLE GOITRE

S. Graham Ross, M.D., M.R.C.P.
Montreal

THE problem of simple goitre has received much attention of late. There is a growing recognition of the fact that endemic goitre, the most important type, is a problem of public health and of child welfare. The latter standpoint is reasonable when one considers the three periods at which goitre most frequently develops (a) intra-uterine life (resulting in congenital goitre), (b) puberty, (c) pregnancy. The second of these is the most important. Cretinism and cretinoid conditions bear also the closest relation to endemic goitre.

Ætiology. The ætiology of the disease remains unsettled. Many support the theory of infection. McCarrison[1] in India arrived at the conclusion that the causal agent or agents were facultative anærobic organisms, probably bacteria, growing in the intestinal tract. They produced toxins which, after absorption, acted on the thyroid gland causing goitre. From experiments on rats[2] he concluded that (a) approximately 63 per cent. of the offspring of goitrous parents (rats) were born with congenital goitre, (b) congenital goitre was due to the action on the fœtal thyroid of toxic substances derived from the maternal intestine. By experiments on goats[3] he found that by the feeding of cultures of micro-organisms grown from the fæces of goitrous individuals, the goats all developed goitre within six months. In a review of the subject[1] he claimed that during the pregnancy of a goitrous mother the toxin was carried to the fœtus, and might cause congenital goitre or varying degrees of cretinism in the offspring. He found that the mother of cretins in goitrous localities were almost invariably goitrous while of the cretins themselves 50 per cent. had goitre. He laid stress on the importance of a careful consideration of the ante-natal history in order to facilitate the early recognition of cases of congenital hypothyroidism. Otherwise these were rarely recognized until the end of lactation. It was his opinion that a degree of immunity was developed in endemic areas so that visible goitres were comparatively rare in indigenous children under eight years. The most susceptible age appeared to be nine years in a boy and ten in a girl. McCarrison's work cannot be accepted as conclusive for several reasons. In the first place the specific micro-organism causing the disease has not been isolated; secondly, work of other experimenters has failed to confirm his results.

Hirshfield and Klinger[4] through experimental work on endemic goitre arrived at almost opposite conclusions to those of McCarrison. Working with rats they found that the administration of water from different goitrous localities gave inconstant results. They concluded that water from a goitrous area was not the ætiological factor. Feeding experiments with the intestinal contents of goitrous rats were also unconvincing, and made the probability of a goitre-producing parasite unlikely. They also decided the the lack of iodine in the diet was unlikely to be the cause of goitre. In their opinion goitre was not a chemical intoxication or infectious in nature, but rather due to a change in metabolism especially of protein. The authors do not enlighten us as to the nature of this metabolic disturbance. But there are observations which, in the minds of some authors, seem to point at times to an infectious origin of goitre. These are the apparent epidemic outbreaks of goitre which have been reported from time to time, and when other causal factors can be excluded, they give support to the theory of infection. During the war several of these were noticed in Austria-Hungary. Cemach[5] reported a series of fifty-three cases seen during 1915-1916 in one Vienna clinic. The subject's were all destitute, poverty-stricken refugees from Galicia. The writer heard of many other similar cases in the city. These refugees did not come from a goitrous district nor was goitre endemic in Vienna. This suggested to the author the possibility of an epidemic outbreak.

A great increase in the incidence of goitre in children was noticed in Budapest during the last year of the war. Vas[6] reported that among the twenty to thirty thousand cases seen yearly at one hospital the incidence of goitre varies from 0·03 per cent. to 0·21 per cent. In the first seven months of 1918, there were 188 cases of goitre among fourteen thousand cases or 0·83 per cent. A corresponding increase was noticed in adults. The cases arose in several fairly well localized areas throughout the city. Apparent house infection was also noticed. After discussing the ætiology the author concluded that the causal agent was probably water-borne and likely of an infectious nature.

Reporting the growing frequency of goitre in a locality in the west of England, H. J. Boyd[7] found the only factor bearing on the ætiology had been a change in the water supply from shallow to deep wells. Barherd[8] in Switzerland claimed that goitre was more prevalent in places poor in sunlight, e.g., deep mountain valleys. He suggested the hypothesis that sunlight by its sterilizing effect upon the drinking water might be a prophylaxis against the incidence of goitre.

Marine in the United States[9] summed up his experimental work on the production of goitre in dogs as follows:

(a) Developmental stage of all goitres is characterized by increased blood-flow, increase in the size and number of epithelial cells, decrease in the stainable colloid of follicular spaces, marked absolute decrease in the iodine content. Decrease in the iodine content precedes cellular changes.

(b) Similar thyroid changes (compensatory hyperplasia) invariably occur in remaining portion of gland when sufficient portion is removed.

(c) Administration of exceedingly small amounts of any salt of iodine protects against the compensatory hyperplasia.

(d) If most of the thyroid gland is removed before or in the early stages of pregnancy, the pups at birth will have enlarged thyroids.

(e) Thyroid gland has an extraordinary affinity for iodine shown experimentally.

This data strongly suggests the possibility of goitre being a deficiency disease due to a lack of iodine supply to the body whether carried in the food or water.

Prophylaxis and Treatment. It is well recognized that prophylaxis against goitre is easier than its cure. As pointed out above, the two danger periods are (a) that leading up to puberty, (b) pregnancy. Prophylaxis in the second instance will protect not only the mother, but her child. Our two most valuable remedies are iodine and thyroid extract. The isolation by Kendall in 1914 of the alpha-iodine compound from the thyroid gland—a substance containing 60 per cent. of iodine and apparently the active principle of the gland, has helped to place iodine therapy on a rational basis. Not infrequently cases have been reported where a woman with goitre has borne children with congenital goitre and at the next pregnancy by the prophylactic use of thyroid extract the infant has been born healthy. Might not the same be accomplished by the use of iodine?

Workers with the most diverse views as to the ætiology of goitre bear witness generally to the value of iodine therapy. Grumme[10] advocated this treatment in Switzerland and mentioned the work of Frey who treated uncomplicated goitre with monthly courses of iodine, and claimed good results without harmful secondary effects. He mentioned Oswald's opposition to iodine therapy based particularly on the danger of thyro-toxic symptoms. The writer considered the danger overrated. The risks, just as in the treatment of syphilis with salvarsan, were justified in view of the great benefits obtained. He pointed out that the endemicity of goitre corresponded closely to the lack of iodine in the food, and in connection with the comparative freedom of maritime districts from goitre he had demonstrated that the thyroid glands of dwellers in Hamburg contained, proportionally to weight, two to three times as much iodine as dwellers in Freiburg where goitre was endemic.

McCarrison[1] also claimed iodine to be the most potent of all remedies. He recommended rather large doses,—Tinct. Iodi. MV combined with Pot. Iod. gr. V,—as an initial dose; this to be gradually increased to four times that amount. The boiling of drinking water, correct hygienic conditions, and intestinal antiseptics were other measures advised. He claimed that the above treatment would cure the majority of cases.

It has remained for Marine[9] and his co-workers in the United States to undertake the prevention and treatment of goitre on a large scale. Following successful experimental work on animals and fish, they attempted the prevention and control of the disease in children in one of the endemic areas of the Great Lakes basin. It was arranged to administer prophylactic treatment to pupils of the public schools of Akron, Ohio Girls were selected on account of the greater frequency of the disease in their sex. The ages ranged from ten to eighteen. To such as selected treatment sodium iodide in doses of 2 gms. to the younger and 4 gms. to the elder pupils, was administered in a period extending over two weeks. This amount was to be repeated every six months. Previous to treatment 3872 girls were examined. In 43·6 per cent. of these the thyroid was normal, in 49·9 per cent. slightly enlarged, and in 6·3 per cent. moderately enlarged. Six months later the authors re-examined the cases and gave the results of treatment from May, 1917, to November, 1917[11]. Of the 764 who had volunteered for treatment not a single girl with a normal thyroid at onset had enlargement, while the goitre had disappeared from 33·5 per cent. of those who had had slight enlargement. Of the 1879 who had not taken treatment, goitre had appeared in 26 per cent., while the goitre had disappeared from only 1·2 per cent. of those with slight enlargement. The moderate goitres showed a similar tendency to disappear under treatment.

These encouraging results were confirmed by the results of continued treatment up to November, 1918[12] and in their fourth paper[13] they summarized the results of treatment over a period of thirty months up to October, 1919. During this time 2190 took treatment, whereas 2305 did not officially undergo the same (although the authors have reason to believe that many of these underwent treatment at home).

Prevention. Of those who were normal at the first examination and did not take iodine, 347 or 27·6 per cent. had enlarged thyroids, while of those who were normal at the first examination and took iodine 2 or 0·2 per cent. had enlarged thyroids. Of those classified as having slightly enlarged thyroids at the first examination who did not take treatment, 127 or 13·3 per cent. had a further increase in the size of the thyroid, while of those taking the treatment 3 or 0·3 per cent. had a further increase. Corresponding results were seen in the moderately enlarged thyroids.

Curative or therapeutic effect. Of patients whose thyroids were slightly enlarged at the first examination and who took iodine, 659 or 57·8 per cent. of the glands underwent a decrease in size, while of those not taking treatment only 134 or 13·9 per cent. of the glands became smaller. The same tendency was observed in the case of moderate enlargements.

The authors concluded that (a) goitre is an easily preventable disease, (b) its prevention in adolescence should be a public health problem, (c) there is practically no danger of untoward secondary effects such as iodism or hyperthyroidism.

Bernhard[8] mentioned Kocher's suggestion for the use of minimal amounts of iodine as a prophylactic in the schools. Special wells treated with iodine might be established at each school. Judging from the numerous references in their literature the Swiss medical profession is recognizing the necessity of facing the problem. Klinger[14] in a communication in 1918 expressed the hope that a rational prophylaxis of endemic goitre would soon be organized. Although the ætiology was still doubtful the search for a prophylactic agent must not be put off on that account. He proposed the systematic giving of iodine especially to children in the goitrous areas; 2-4 mgs. daily making 1-1.5 gms. yearly was the dose suggested. The experiment should be continued for a number of years. In the following year the same writer[15] lamented the fact that no prophylactic organization had yet been started. He reviewed the work of Marine in the United States and considered that it might well be copied on a large scale in Switzerland.

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1. McCarrison.—Endemic Goitre, *Practitioner*, 1915, xciv, 70.
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Abstracts from Current Literature

SURGERY

Penetrating Wounds of the Chest. Heuer, Pratt and Mason: *Annals of Surgery*, 1920. Vol. LXXII, p. 352.

After a short discussion of opinions held regarding indications for operative interference in cases of war wounds of the chest prior to March, 1917, the authors outline and give their reasons for the routine adopted at Evacuation Hospital No. 1. Through and through bullet wounds without open pneumothorax or extensive rib fractures, and penetrating bullet wounds and small shell wounds were treated expectantly. Operation was performed as soon as possible on (a) wounds with sucking pneumothorax, at the time of operation removing foreign bodies, controlling hæmorrhage, and suturing or resecting the lung when indicated; (b) those with an acute continuous hæmorrhage threatening life; (c) those with large intrapleural or intrapulmonary foreign bodies; (d) those with extensive rib fractures.

Normal uncomplicated cases showed febrile reactions from 100°-103° or 104°. Most frequently the temperature began to decline on the third to the fifth day, but showed a daily run to 99° or 101° for from ten days to two weeks.

The various complications such as infected hæmothorax, pneumothorax, pneumonia celulitis, and gangrene, are discussed.

Aspiration was performed in all cases of large hæmothorax both for diagnosis and as a therapeutic measure. Either smaller quantities 200 to 500 c.c. were removed daily from the fourth day, or aspiration was postponed to the 10th or 12th day, when all the blood that could be obtained was removed. All cases which had suffered from a large hæmothorax showed one month after injury adhesions obliterating the costo-diaphragmatic angle and to practically the same extent, whether they had been aspirated or not.

F. B. G.

Subluxation of the Head of the Radius. Grossman, Jacob: *Medical Record*, December, 1920, Vol. XCVIII, p. 981.

Based on the study of thirty-seven cases of this injury of which illustrative cases are recorded, the author comes to the following conclusions:—

1. Subluxation of the head of the radius is a fairly common condition and is often overlooked It is often diagnosed as sprain of the shoulder or wrist or fracture of the forearm.
2. It occurs only in children, generally between the ages of eight months and three years.
3. The mode of production and the subsequent picture, namely raising or dragging the patient by gripping the wrists, and the apparent flaccid paralysis, are characteristic of this condition.
4. It is often called "traumatic palsy" of the upper extremity, inasmuch as the child allows the arm to hang limp and refuses to move it on account of the pain.
5. Extreme forcible supination is all the treatment required to overcome the subluxation. Reduction is accompanied by a distinct click. After care is not necessary.
6. As relapses may occur parents whould be warned of the risk of dragging or lifting thier children by gripping the wrists. F. J. T.

Recent Consideration in the Management of Fractures. Moore, C. Howard and Smith, Alan de F. *The Military Surgeon*, December, 1920, Vol. XLVII, P. 666.

A series of 1,400 fractures arising in the United States Third Army following the armistice in November, 1918, conforming to the types met with in civil practice, furnished the authors with the opportunity of demonstrating the applicability of methods largely developed during the war to cases seen in civil life. Among the various causes cited athletics were responsible for 22·8 per cent., motor vehicles 21·2 per cent., and falls 17·8 per cent. Injuries from firearms formed but 3 per cent. of the total. From their results they add emphasis to the conclusions of Sir Robert Jones, Sir Anthony Bowlby and others, that the fullest co-operation and success in the treatment of fractures can be obtained in peace as in war by the concentration of cases.

The paper urges the importance of the following points:—

1. That the treatment of fractures by a com-

bination of traction and suspension is of the greatest usefulness in cases of the civil type and is the method of choice in the great majority of fractures of the shaft of long bones.

2. The earliest possible reduction or other definitive treatment of a fracture is imperative, regardless of the amount of swelling or any other condition, except shock.

3. That in any community where fractures occur in large numbers they can be treated most satisfactorily in special fracture services.

4. A standard equipment consisting of a few simple splints such as the army patterns lead to the most satisfactory results in the treatment of fractures received in civil life as well as in war.

5. Well equipped departments of hydro and electro-therapy, physiotherapy and occupational therapy are necessary auxiliaries of a fracture service.

6. The fullest co-operation between the surgeon and the radiologist is essential. A portable bedside *x*-ray equipment is necessary for the treatment of fractures by the suspension and traction method. F. J. T.

Studies in the Effects of Nitrous Oxide-Oxygen Anæsthesia on Experimental Tubercle Bacillus Infections. Rogers, J. B.: A paper read before the Interstate Association of Anæsthetists, Pittsburg, Oct. 6th, 1920.

Due to the great prevalence of pulmonary tuberculosis an anæsthetic that can be used for operative procedures on tuberculous individuals, without producing injuries to them, is greatly needed. Only during the last few years has it been fully recognized that a rapid spread of the disease often followed operations on the tuberculous under ether anæsthesia, and for this reason clinicians treating cases of tuberculosis generally advised against surgery except under extreme circumstances. From the work of Corper, Brown and Petroff, Zueblin and Rogers, it can be seen that repeated ether anæsthesia on tuberculously infected animals does not result in more rapid spread of the disease process. From the work of Dunham it seems established that the spread of chronic tuberculosis through the lungs, with fatal termination of the disease, comes largely as a result of aspiration from the apical lesion causing aspiration bronchopneumonia and after a few months, death. Presumably ether anæsthesia by causing laboured respiration and increased mucous secretion determines the incidence of aspiration bronchopneumonia. To determine the relative inocuousness of nitrous oxide-oxygen anæsthesia in the presence of tuberculosis several series of experiments were made on guinea pigs to determine whether or not the administration of these gases would hasten or retard the development of the tubercle or otherwise influence the general health of the tuberculously infected animals. All animals were first sensitized with an avirulent culture of human tubercle bacilli and then were infected through the respiration route. Beginning twenty-four hours after infection the animals were given nitrous oxide-oxygen anæsthesia for fifteen minutes on nine successive days. Control animals were left unmolested. Twenty guinea pigs, suffering with pulmonary tuberculosis, were given repeated nitrous oxide-oxygen anæsthesia. In series 1, eight of the thirteen controls died from pneumonia before the experiment was completed, while only three of the thirteen anæsthetized pigs died during the experiment. Of the four controls which died after fourteen days, all showed tuberculosis of lungs, liver, spleen and bronchial glands. When the ten anæsthetized and four remaining controls were dissected thirty days after infection, no difference could be noted in the anatomic distribution or extent of tuberculous involvement. In series 2, the disease was permitted to develop fourteen days and the animals were then anæsthetized with nitrous oxide-oxygen each day for fourteen days. Immediately following the last anæsthesia both the experimental and control animals were killed and sectioned but no difference in the amount of tuberculous involvement in the anæsthetized and control animals was found. Hence the following conclusions may be drawn: (1) Nitrous oxide-oxygen anæsthesia, administered daily to guinea pigs suffering from pulmonary tuberculosis, does not influence the development of the disease, neither is it detrimental to the general health of the animal: and (2) since these gases do not cause as much labor in respiration and are less irritating than ether, they can be considered more suitable for anæsthesia, when used in cases of pulmonary tuberculosis and other respiratory diseases.

W. B.

MEDICINE

Studies on the Acetone Concentration in the Blood, Urine and Alveolar Air (papers 2 and 3). WIDMARK, E. M. P.: *The Biochem. Jour.*, July, 1920, Vol. XIV.

WIDMARK proves by experimental work that acetone diffuses readily through all the tissues of the body. The wall of the urinary bladder is no exception. Therefore the concentration of acetone in the urine is practically always the same as that in the blood. No concentrating action of this body can be brought about by the kidney. Aceto-acetic acid is present in the blood mainly as a dissociated salt, therefore exerting only a limited action in penetrating animal membranes. Passing through the kidney it is concentrated, enabling it to be present in the urine in a greater concentration than in the blood.

The author disproves the theory that any secretory activity is exerted by the lungs during the passage of acetone from the blood into the alveolar air. It is a pure diffusion process. Thus through the alveolar air it is possible to determine the free acetone concentration in the blood.

On the Testing of Renal Efficiency with Observations on the "Urea Cœfficient." MACLEAN, H. and DE WESSELOW, O. L. V.: *Brit. Jour. of Exp. Path.*, February, 1920, Vol. I.

MACLEAN and Wesselow describe a new functional test for determining the ability of the kidney to concentrate urea. The test has been used with great satisfaction in over 1200 "persons suffering from the effects of war nephritis". The technique is as follows: After emptying the bladder the patient drinks 15 grams of urea dissolved in 100 c.c. of water. The patient then voids at the end of one hour and likewise in two hours; the percentage concentration of urea being determined in each specimen separately. Normal kidneys should concentrate urea above 2 per cent. If the concentration falls below 1·5 per cent. there is usually advanced functional disturbance.

Preservations of Blood Intended for Blood Sugar Determinations. DENIS, W. and ALDRICH, M.: *Jour. of Biolog. Chem.*, October, 1920, Vol. XLIV.

THE authors report that the addition of one drop of commercial "formalin" to 5 c.c. of oxalated blood will prevent glycolysis for ninety-six hours. Also it does not interfere with the accuracy of the sugar determination when done by Folin and Wu's method. This note would seem to have great practical application in the treatment of diabetes mellitus.

E. H. M.

Lethargic Encephalitis. BUZZARD, E. F. and GREENFIELD, J. G.: *Brain*, 1919, part 4, p. 305.

THIS contribution contains a recapitulation of two previous papers, already published in *The Lancet*, December 21st, 1918 and *Proc. Roy. Soc. Med.*, August, 1919, to which the authors have added recent observations and a description of the morbid anatomy.

The material on which they base their conclusions consists of a series of twenty-two cases, with five autopsies as well as a number of outside cases which were made use of for this work.

Emphasis is placed on the varying symptomatology in the involvement by a generalized inflammation of an organ whos functions are so numerous and the authors, at the outset, insist on the *impossibility of diagnosing the disease from the presence or absence of any symptom or group of symptoms*, and maintain that such diagnosis must, rather, be made from a consideration of the onset and course of the disease and by the elimination of other pathological conditions which may produce similar symptoms and physical signs.

They are content to divide the symptomatology into *three groups of cases*, which show characteristics, sufficiently distinct to merit consideration.

1. Cases characterized by hemiplegia, hemianæsthesia, hemianopia, etc.
2. Cases characterized by symptoms resembling those of paralysis agitans; the basal ganglia group.
3. Cases characterized by disturbance of the function of the cranial nerves.

They point out that these groups correspond to different anatomical levels of the brain and suggest the chief incidence of the inflammation in each of these levels, though clinical and pathological observations show that the disease is more widespread than might be suspected from the most prominent symptoms.

A further grouping is made to show the wide variation existing between the *severe* and *mild* types and due emphasis placed on the great number of the latter, *many of which must pass, unrecognized.*

The severe forms, which more often come to autopsy, would appear to fall under the class 3, where the chief incidence of the inflammation falls upon the cranial nerve nuclei, while in marked contrast, many cases have appeared in recent months which had never been considered seriously ill. These are characterized by the insidious onset of slight lethargy, disturbance of the sleep cycle, slight memory defect and alteration in temperament, while fleeting attacks of diplopia and general muscle stiffness may supplement the symptom-complex.

It is suggested that *the lethargy*, characterizing some cases may be attributed to a condition of hydrocephalus induced by inflammation and œdema in the region of the corpora quadrigemina, interfering with the circulation of the cerebro-spinal fluid.

Consideration is given to the late development of *involuntary movements*, affecting the limbs, jaw or tongue, which form interesting sequelæ of the more severe cases. These movements are sometimes irregular and choreiform, sometimes rhythmical and limited in their distribution, but vary so much as to render difficult any accurate description. They are in abeyance while the parts concerned are in voluntary use, more obvious when resting and cease altogether during sleep.

As to their pathogenesis, the authours incline to the view that they represent the release of some nervous activity by interference with control, rather than that they are the result of chronic irritation, and no attempt is made to correlate their occurrence with any local lesion.

In considering group 1 type of case, emphasis is placed on the difficulty of differentiating these cases from cerebral tumour, abscess or hæmorrhage and particularily from more subacute lesions such as abscess or syphilitic thrombosis.

As to *prognosis*, they say "Further experience may teach us more. At present we can only say that some cases recover completely, others survive the acute stage but carry with them in after life permanent defects, while a certain number die either from toxæmia or hæmorrhage in the acute illness or from some complication following it."

As to treatment, no method is suggested that might abort or cure the disease and from their experience, in four cases, they suggest that operative interference, in the way of decompression, is contraindicated in spite of the presence of increased intracranial pressure. Three of these cases, operated upon, died from hæmorrhage and it is hard to believe that decompression can be beneficial when this hæmorrhagic tendency exists.

A brief summary of the pathological findings given in order of the most constant occurrence is:

1. Vascular congestion.

2. Toxic degeneration of nerve cells and slight neuronophagy.

3. Proliferation of mesoblastic cells of the vessel walls and infiltration of the nervous tissue with these cells.

4. Small-celled infiltration of the Virchow-Robin space.

5. Glial proliferation.

Venous thrombosis and hæmorrhage were by no means constant findings. The former was more constant than the latter and these thrombi may occur in any vessel and in any region.

Hæmorrhage seemed to be due to two distinct causes, of which the commoner form is that where a ring of hæmorrhage surrounds a congested vessel, having broken into the perivascular space of His and, later, from pressure or fragility of glial tissue, into the tissues at some distance from the vessel.

The other form of hæmorrhage is due to infarction following upon arterial thrombosis. F. H. McK.

The Parkinson Syndrome in Encephalitis Lethargica. Marie, Pierre, and Levy, C.: *Bull. de l'Acad. de Med.*, June, 1920.

The author presents the differential diagnosis of postencephalitis parkensonian syndrome from true Parkinson's disease (paralysis agitans).

He begins with a discussion of the divergent views as to the location of the lesion in paralysis agitans, considered by some to be in the basal nuclei, particularily in the lenticular nucleus, while others believe it to be in the cerebral peduncles.

He first considers the age of onset. The Parkinsonian syndrome may appear at any age, most often between the age of twenty and forty while true Parkinson's disease rarely begins before the age of forty.

The association of the Parkinsonian syndrome with pre-existing infection is important.

In paralysis agitans the onset is described as "progressively hemiplegic", that is, it progresses slowly from one member to the other on the same side of the body.

No such mode is seen in the Parkinsonian syndrome where, on the contrary, the onset is abrupt and involvement of all the extremeties and body takes place at the same time.

The typical tremor of paralysis agitans is lacking in the Parkinsonian syndrome. In encephalitis the movements are of the nature of spasmodic jerkings, are of large amplitude and are not constantly in abeyance, during voluntary movement.

Finally and because of the widespread involvement of the brain stem in encephalitis, there are associated signs, such as arise from involvement of the tongue and masseter muscles which are not met with in paralysis agitans.

The course of the disease is also of importance, as in encephalitis the syndrome may completely disappear, while in paralysis agitans, no cure or abatement is seen.

The Cerebro-Spinal Fluid in Epidemic Encephalitis. Boveri, Piero: *Jour. Nerv. and Ment. Disease*, October, 1920, Vol. LII.

The author reports his conclusions on the examination of sixteen cases of epidemic encephalitis, ranging in age from fourteen to sixty years. The examination was made, in each case, at intervals during the disease from the fifth to the thirty-fifth day.

Pressure. Slight increase in eight cases, normal in the others. The increase does not appear to bear any relation to the seriousness of the disease, but was at its height during the early and acute stage.

Colour. Always clear like pure water, no fibrinous deposit was seen.

Albuminoids (globulin and albumin). There is often a slight increase in albuminoids (about one-half of the cases) as tested by Cantaloube's albuminometer and the Nonne reaction, but never was there a strong positive reaction.

Reducing power. In general there is an increase in the reducing power of the liquid.

Cytology. Made by Nageotte's chamber, the cell count ranged from two to fourteen lymphocytes. Any increase occurs during the initial stage of the disease.

The slightest of the alterations and their uniformity in all phases of the disease are factors of great importance especially in view of the differential diagnosis of epidemic encephalitis from the different forms of meningitis, particularly tubercular and syphilitic.

Choreo-Athetoid and Choreopsychotic Syndromes as Clinical Types or Sequelæ of Epidemic Encephalatis. Archambault, LaSalle: *Arch. Neur. Psych.*, November, 1920, Vol. IV.

An exhaustive clinical study of the incidence of epidemic encephalitis upon the basal ganglia and frontal cortical regions of the brain leads the author to recognize two distinct symptomological syndromes, representing each of these cerebral levels.

Recognizing with most previous writers, that the symptoms more commonly observed point to an especial prediliction for the pontopeduncular region and the basal ganglia, he carefully points out that the frequent occurrence of quite dissimilar, though almost equally typical, syndromes affords presumptive evidence that the histological changes may be disseminated throughout the entire nervous system, with focal predominance at any given level.

He further suggests that time will show that what is now regarded as the classic clinical physiognomy of the disease depends on the overwhelming preponderance of the lesions in the peri-ventricular gray matter, —the strio-thalamo-tegmental region.

Of many other less usual and less typical forms of the disease, he selects for special study two distinct symptomological groups which he designates as: (1) Choreo-athetoid and (2) choreopsychotic types.

While choreiform movements and psychotic manifestations have been referred to by various authors from the earliest accounts of the disease, they were regarded simply as one of many striking features in the clinical findings, but the author, in a series of sixty cases, found these manifestations sufficiently frequent and striking to justify him in recording them as special syndromes, representing a preponderating incidence of the infection upon special brain regions or levels. He furthermore emphasizes the belief that further intensive study, both anatomical and clinical, of this newly identified cerebrospinal affection, promises to elucidate the pathogenesis of many hitherto baffling neurological disorders, such as paralysis agitans, choreiform and athetoid states, endocrinal dysfunctions and even certain of the psychosis.

Nor does he disregard consideration of a classification, based on the course or evolution of the disease, as has been propounded by writers on this subject, though he suggests that many of the manifestations hitherto looked upon as sequelæ, attracting attention, as they often do, during convalescence or after the patient has been allowed to resume work, are really the expression of slowly evolving degeneration changes in the cellular complexes of the basal ganglia, engendered by a prolonged and stealthily increasing inadequacy of the vascular supply.

This, he believes, explains the frequent relapse of certain symptoms, commonly observed in patients who run a mild and supposedly abortive type of infection and is a manifestation of the essential chronicity frequently observed in the disease. Such late manifestations, occurring in the pseudoconvalescent stage of the disease, frequently presents the clinical picture of Parkinson's disease or the choreo-athetoid syndrome.

Representative of the choreo-athetoid syndrome, three cases are cited which within three months, following a typical attack of epidemic encephalitis, developed rhythmic oscillatory movements of the head and extremities, of unilateral distribution. The head slowly rotated from side to side, the mouth retracted and the face exhibited the expression of anxiety or distress. These spasmodic movements were essentially characteristic, being of the nature of athetosis in the face and neck and on the contrary, more closely analogous to choreiform jerkings in the extremities.

Under the choreopsychotic type four cases are detailed which, during the acute stage, exhibited a minimum display of the ordinary and more familiar manifestations of epidemic encephalitis, such as lethargy.

asthenia or typical ocular pareses, but later developed the striking features of choreiform twitchings and persistant psychotic disturbances, such as mental confusion, disorientation and hallucinatory delirium. These were singularly related to the usual work or occupation of the patient who persisted in the performance of his former habitual activities. Two of these cases terminated fatally.

In discussing the pathogenesis, the author draws a clinical analogy between these syndromes and the very similar symptomatic expressions of such diseases as paralysis agitans, Huntington's chorea, athetosis and progressive lenticular degeneration. He draws attention to the observations of J. Ramsay Hunt on the pathology of the corpus striatum, particularly with reference to the pathogenesis of paralysis agitans and cites his conclusion that there are two syndromes, resulting from elective cellular degenerative changes in the corpus striatum, namely chorea and paralysis agitans. He furthermore relates the findings of Marie and Lhermitte in several cases of Huntington's chorea in which they found chronic leptomeningitis, atrophy of the frontal lobe and massive atrophy of the corpora striata, more particularly the putamen, all resulting on slowly progressing but definite alterations in the vascular systems concerned.

Reasoning by analogy, he assumes that the pathology of epidemic encephalitis serves to confirm the actually favoured hypothesis, regarding the striatal origin of choreic and athetoid spasms. Similarly a predominating implication of the meninges and cortex of the frontal region is believed to be responsible for the psychotic form of the disease. One case of the choreopsychotic syndrome group bore a striking resemblance to general paresis in which disease the maximum cortico-menengeal changes are distributed over the frontal lobes.

In conclusion, he reminds us that these syndromes *develop late in the course of the disease*, generally months after all acute manifestations have passed and reasonably assuming that encephalitis, like poliomyelitis, has existed in sporadic form for centuries, indicates the possibility of such an infection originating the degenerative changes that underlie such clinical symptomgroups as paralysis agitans, Huntington's chorea, athetosis, Friedriech's ataxia, multiple sclerosis and even dementia præcox and other psychoses. F. H. McK.

Glucose as an Adjunct in the Therapy of Pneumonia.

John, H. J.: *Am. Jour. Med. Sci.*, October, 1920, Vol. 160, p. 542.

The authour reports observations on a series of 137 cases of broncho-pneumonia treated with repeated injections of glucose.

He uses a ten to thirty per cent. solution of chemically pure glucose, made up in distilled water and sterilized in the autoclave. During the febrile period, 250 c.c. of this solution are introduced into a vein twice or thrice a day. The injection is made slowly, from fifteen to thirty minutes being used for the above quantity. He adds to this solution 0.008 gm. of morphine sulphate and 0.00064 gm. of atropine sulphate as he finds that these drugs decrease the frequency of chills following the injection. Chills, however, follow 20 to 30 per cent. of the infusions but they are not of any serious import.

He notes the following results of the treatment: a refreshing sleep, lessened delirium, copious sweating and diuresis, and a lowered temperature. Besides giving an added amount of fluid the glucose provides a certain number of extra calories. The treatment should be begun early in the disease and digitalization of the heart may be carried out rapidly by adding the tincture (m.xv.) to the first four or five injections.

D. S. L.

The Management of the Heart in Pneumonia.

Brooks, H. and Carrol, J.: *Amer. Journ. Med. Sci.*, December, 1920, Vol. 160, p. 815.

The authors emphasize the fact that a large proportion of pneumonia cases die a cardiac death, and that pneumonia is a two system disease (respiratory and circulatory).

The main cardiac lesion is an inflammation or degeneration of the cardiac muscle. The chief stress is placed on the right side of the heart, where the margin of reserve is slight as compared with that of the left side. The paramount factor in the prognosis is the ability of the right heart to resist the mechanical and toxic effects of the disease.

Failure of the right heart must be treated early and energetically if a fatal issue is to be avoided. Early recognition of right sided failure, however, is a matter of some difficulty, the cardinal signs are: unexplained increase in cyanosis, dyspnœa, and the appearance of substernal discomfort and of œdema of the lungs. A weakened pulmonic second is of importance. Increase of the præcordial dullness is to be made out at at times, but fluoroscopy offers the only certain method of recognition of early dilatation of the right auricle.

To offset the effects of this toxic myocarditis, the authors place great faith in the exhibition of digitalis early in the disease, before the muscle has become seriously compromised. In the acutely ill they recommend 15 to 20 minims of the tincture every two or three hours till the rate is slowed, the pulse becomes fuller and the muscle sounds good. Failure of the right side is a signal for maximum doses of the drug.

In cases where the heart is seriously involved on admission they recommend the massive dosage of Eggleston.

Decreasing physical strain is of great importance and careless handling of the patient by too frequent examination and meddlesome therapy is deprecated. The avoidance of circulatory strain is carried on through convalescence, the patient being allowed out of bed only after a fortnight of normal temperature.

For emergency stimulation adrenalin has a place, but *only* as an emergency measure. The same applies to caffein and camphor.

Small doses of morphin and codein are useful, not only to quiet cough, but also to conserve the circulation by quieting the restless and delirious patient.

In a small group of cases venesection does good. In the plethoric and obese when the invasion is attended by intense cyanosis, dyspnœa and evidence of insufficiency of the right heart, blood letting gives great relief. Especially is this the case in the hypertensives. In the later stages it is rarely to be advised.

Finally the promotion of excretion by the kidneys and bowel, and the use of an easily combustible diet in which the carbohydrates play an important rôle, are points of great importance in the management of pneumonia. D. S. L.

The Influence of Protein Food on Increased Blood Pressure. Mosenthal, H. O.: *Amer. Journ. Med. Sci.*, December, 1920, Vol. 160, p. 808.

There seems to be a general impression that a low protein diet reduces the blood pressure. Mosenthal shows, however, that in cases of nephritis with moderate to severe grades of hypertension, neither a low nor a high protein diet has any regular effect on the systolic or diastolic pressure. True his periods were relatively short (four to twenty-seven days) but they always sufficed to produce large variations in the waste nitrogen products in the blood without any variation in the pressure.

From this work it would appear that we must look elsewhere for a method of controlling hypertension.

D. S. L.

Notes on the Ætiology of Goitre. Boitel, M. W.: *Revue Médicale de la Suisse Romande*, November, 1920, p. 717.

In an historical introduction the author points out that practically all our knowledge of goitre is due to the work of Coindet, who in 1819 discovered the action of iodine in goitre, of Kocher, of Reverdin, and others, who as early as 1882 described post-operative myxœdema, and showed that water causing goitre is rich in bacteria. All later work, both experimental and statistical, is disputed, and diametrically opposite conclusions have been reached.

After an extensive review of the various theories of its ætiology, in which infection, either water-borne or by contact, is given a prominent place; and of the view which attributes it to a lack of iodine in the system, he gives his own results.

From the records of Prof. C. Roux, at the Hospital of Lausanne, he made a study of 1308 cases, who came there during thirty years from the one canton of Vaud. These tend to show that the maximum number of patients came from the valleys and low-lying plains; while the minimum were found on the mountain slopes. Heredity was shown in 47 per cent. of cases. Although boiling the water has been recognized as preventing goitre, the distribution was entirely different from that of typhoid fever, a water-borne disease. There seem to be a slightly greater proportion of cases among the rural population than in the cities.

He considers that therapeutically iodine does not affect the cause of goitre, but only the symptoms, either by stimulating the impaired function of the thyroid, or by increasing the fluidity of its secretions and thereby favouring their absorption. The best method of administration is in small continuous doses,—as by painting on the tincture of iodine. Prof. Roux has advised keeping a bottle of this preparation uncorked in the room. Even a small quantity of iodine added to our table salt has been recommended as a means of prophylaxis. J. L. D .M.

Treatment of Gonorrhœal Arthritis by the Subcutaneous Injection of Liquid from the Joints. Dufour, H. and Debray, M.: *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, November, 25th, 1920, p. 1391.

The authors report three cases of this acute condition treated by removal of fluid from one of the affected joints by means of a needle and a syringe, and the direct re-injection of 10 c.c. of this fluid under the skin of the thigh without any manipulation or sterilization of the liquid. There were no local or general reactions and the pain and swelling disappeared in a few days. J. L. D. M.

Three Cases of Late Jaundice Due to Salvarsan in Non-Syphilitic Patients. Golay, M. J.: *Revue Médicale de la Suisse Romade*, November, 1920, p. 764.

The author reports three cases, from the Dermatological Clinic of Geneva, treated for other skin diseases by a course of novo-arsenobenzol, and shown by history and blood-tests to be free from syphilis, in which jaundice developed in about three months after the cessation of treatment. From these cases and from previous work on syphilitic cases, he concludes that the late jaundice following the administration of salvarsan is a toxic hepatic jaundice, and is not due to syphilis, but rather to arsenical intoxication, which usually disappears without any specific treatment.

PÆDIATRICS

Some Phases of the Pathology of Nutrition in Infancy.

Marriott, W. McKimm: *Amer. Jour. Dis. of Children*, December, 1920.

Since the chief function of the infant is growth, it is not surprising that its nutrition should be the chief concern of those responsible for its welfare. Almost any factor, external or internal, which affects the infant at all has an influence on its nutrition. No organ or system in the body becomes affected without involving to some extent its general nutrition. A growing realization that it is the infant as an organic whole that must be considered rather than any individual organ has lead to a much broader conception of disease in infancy, and to a more rational therapy. The gastro-intestinal tract is only important because it exerts such a profound influence on general nutrition, and because diseases of this tract are a large factor in infant mortality. Czerny grouped the causes of nutritional disturbances under their main heads: Food, infection, and constitution. Granting the importance of these ætiological factors, we are still largely in the dark as to how each of them acts, and as to why infants suffering from nutritional disturbances should die. Very little information is obtained from the necropsy room.. Finklestein and Meyer have emphasized the conception of food poisoning as a cause of nutritional disturbance; basing their belief on the fact that many of the symptoms are increased when more food is given. A careful search for toxic substances, hypothetic poisons elaborated from food during the processes of metabolism has failed to reveal any facts to support this theory. It seemed to the writer therefore important to search for other possible explanations of the observed facts, and in this paper he presents the results of the search and the conclusions he has drawn.

Two types of nutritional disturbances are considered: (1) The acute, in which the infant is suddenly attacked with symptoms of so-called alimentary intoxication: diarrhœa, vomiting, rapid emaciation; there is a short, shrill cry, a greyish pallor of the skin, a feeble pulse, and suppression of urine; coma or convulsions may close the scene. (2) The chronic form in which the infant gradually wastes; the subcutaneous fat is lost, and skin is dry and wrinkled; the colour is earthy, the features pinched; the abdomen distended; the appetite sometimes poor and at other times ravenous, but at no time does the child profit. This condition is generally referred to as one of malnutrition.

In the first class of cases one is struck by the great and rapid loss in weight; in some instances as much as half or even one pound in twenty-four hours. Nothing but loss of fluids can produce this loss. Experiments on dogs deprived of water show that the giving of food in this condition will produce diarrhœa and vomiting. Without a certain amount of water the digestive functions cannot go on. Thus Finklestein's problem is answered without the supposition of any special toxins. Following this idea we find that the loss of water will account for the diminished volume of blood, the lowered velocity of circulation, the sunken eyes and the greyish pallor. This last symptom is due to the entangling of the leucocytes in the capillaries, which have spasmodically contracted in an effort to conserve the volume of blood for central circulation. The air hunger suggests acidosis or uræmic poisoning.

This likewise is explained by loss of water. Czerny held that it was due to the production of abnormal acid. Keller was unable to find this acid. Steinitz thought it due to loss of bases. Holt and Fales demonstrated that this could not be the explanation. Howland and the author demonstrated the acidosis of the blood, but showed that it was not due to the overproduction of acid, but to failure in elimination of the acid phosphates by the kidneys, and that this was due to excessive water loss. Schloss confirmed this and showed that the lack of elimination was in proportion to the desication of the blood. The effect of water loss on the blood is to produce a concentration which gives rise to an increase in the specific gravity, in the corpuscular content, in the index of refraction in the protein content, in the viscosity and in the osmotic pressure. Starling has shown that increase of colloidal osmotic pressure beyond the arterial pressure in the glomeruli of the kidneys will induce a stoppage of secretion and bring on a condition simulating uræmia. Sometimes the administration of sodium bicarbonate will save these patients, but not infrequently it is insufficient. We must therefore look for some condition more than acidosis. Furthermore, looking at the patient we are struck with the resemblance to a case of shell shock. The greyish pallor, the thready pulse and the prostration point to diminished blood volume and flow, which of itself favours the accumulation of acid products. G. N. Stewart, by an ingenious application of the calorimetric method, found that the normal blood flow of 15 to 22 c.c. per 100 grams of body weight was reduced to 2 or 3 c.c. Hence the failure of the alkaline treatment; sodium bicarbonate will not lower the osmotic concentration which is the factor inhibiting the action of the kidneys. Again, water evaporation is very great in infants; being 55 grams per kilo as compared with 22 grams per day per kilo in adults. As 30 to 40 per cent. of the heat loss of the body is due to evaporation, it follows that with impaired evaporation in this anhydremic state the temperature must rise.

This conception of the cause of the fever in these cases is supported by experiments showing a 600 per cent. increase in water elimination due to a rise in the temperature of the air from 20° C. to 36° C. This great loss in weakly infants may precipitate a crisis and probably accounts for the rapid increase in gastrointestinal troubles during a spell of hot weather; in children kept in a hot and dry room this rapid desication may give rise to what is called heat stroke.

To sum up, the entire clinical picture may be explained by loss of water and the basis of our treatment should be to supply this water to the organism. Other factors may exist, but they are subordinate. In moderate cases fluids given by mouth will soon rectify conditions, but when vomiting and diarrhœa are present this is impossible, and the intravenous and subcutaneous channels must be employed. Sometimes the loss is so great that these are insufficient, so following an English method the writer has introduced large amounts of normal saline into the peritoneal cavity with excellent results. Ringer's solution, and dilute seawater have been used in some cases as substitutes. Dehydration beyond a certain limit causes such a destruction of body cells as to make recovery impossible. The presence of glucose in the system spares protein destruction, so glucose in solution given intravenously may be of definite value, but care must be exercised to keep below the limit that will produce glycosuria. Glucose may also be given intraperitoneally, but this method is liable in some instances to produce a distressful distention.

In regard to the second type, in which we have to deal with a chronic derangement of nutrition, the condition appears to be one of diminished volume and flow of blood, and is brought on by prolonged undernutrition. This occurs frequently in the presence of an excess of food. The reason for this is the inability of the patient to secrete a sufficient quantity of acid in the stomach to digest cow's milk. This permits bacterial invasion of the upper digestive tract and is unfavourable to the action of the curd-splitting ferment; it also gives a slower pyloric reflex, and fails to stimulate the flow of bile and the secretion of the hormone, which calls forth the pancreatic and intestinal ferments.

Cow's milk is shown to require three times the acidity needed to digest human milk; hence the inability of some infants to digest it. The recommendation in these cases is lactic acid milk, or protein milk, or well diluted cow's milk with the calories generously made up by carbohydrates. To make up for tissue loss, as much as 150 to 200 calories per kilo of body weight is advised to be given. The protein in some cases may be reduced to 10 per cent. of the caloric intake with only enough fats to supply vitamines. As dextrin is less liable to produce fermentation and gastrointestinal disturbances, this form of carbohydrate is advised. Recently water soluble B. vitamines have been added with good effect. In these cases, although the food seems to agree, days may elapse before there is any gain in weight. The author follows the case by checking the index of refraction, the volume of the blood, and the rate of its flow. If these show improvementhe awaits with patience the recovery in body weight He sums up the causes of the two types of mal-nutrition as being due, first to lack of water, and second, to lack of nourishment. W. E.

The Use of the "Auto-Urine Reaction of Wildbolz in Tuberculous Children." ELIASBERG, H. AND SCHIFF, E.: *Monatschr. fur Kinderl.*, October, 1920, Vol. XIX, No. 1, p. 5.

The reaction consists of the subcutaneous injection of evaporated urine from suspected subjects. It is based on the observation of Wildbolz that tuberculous patients excrete a tuberculin-like substance in the urine, which if injected subcutaneously gives rise to a reaction similar to that produced by tuberculin. The writers consider that this reaction if positive indicates the presence of active tuberculosis. The advantages claimed for this method are that it is specific and that unlike the injection of tuberculin, its use is not likely to be followed by the activation of a latent process or by the development of miliary tuberculosis. A. G.

The Deaf Child. GOLDSTEIN, M.A.: *Laryngoscope*, 1920, Vol. XXX, No. 8, p. 479.

GOLDSTEIN claims there is but one form of training for the congenitally deaf child and that is the purely oral method. First the child is taught speech and then lip-reading. As the child's brain is receptive at three, deaf children in the Oral School at St. Louis receive instruction at three and a half years of age. He finds most deaf children who are taught by oral methods become good lip-readers. Some congenitally deaf children are at ten or twelve years of age brilliant, fluent lip-readers. It is easier to teach fluent lip-reading than to train a child in intelligible, normal speech.

Children who have acquired speech, even at an early age, before they become deaf, have indeed a great asset and every effort should be made to conserve every vestige of speech. The child who has never heard the sound of human voice is a difficult pedagogical problem. The writer recommends the use of the term "speech-reading" or "expression reading" to lip-reading, as the method depends not on the reading of the lips alone. He strongly advocates for the adult deaf, one uniform system of teaching lip-reading, which should contain the best of all the recognized methods as the Mueller-Walle, the Nitchie, etc.

In New York City there are two excellent Oral Schools for the education of deaf children.

D. H. B.

Le Rôle du Medecine dans L'Œuvre de la Puericulture. Rohmer, P.: *Archives de Medecine des Enfants*, October, 1920.

In 1913 there was in France a mortality, during the first year of life, of 83,000, with a birth registration of 746,000. In 1911 the rate was 743,000 and the infant mortality 117,000. The author attributes the decrease in mortality to the inauguration of milk stations. He does not think the 1913 figures will be improved until breast feeding is more universally employed. He considers breast milk the ideal food for the infant, because amongst the poorer and less intelligent proletariat the artificial method of feeding permits of too many potentially disastrous errors. H. P. W.

Some Peculiarities in the Symptomatology of Childhood. Wilcox, H. B.: *Arch. of Pædiatrics*, October, 1920.

The infant frequently shows great variations in temperature from causes, which, in the adult, would have little or no effect. High elevations may accompany mild disorders where there is no disease. In very young infants a high temperature with great irritability and prostration is as frequently associated with lack of fluids and foods as with any serious bodily lesion. When the normal water reserve is reduced fevers result, because of the lack of water available for evaporation at the normal body temperature. In adults this only takes place when the fluids have been previously reduced to a minimum.

Convulsions are less common during the first four months than in the later months of infancy. This is due to the imperfect development of the nervous system. They become more common when the afferent and efferent tracts and lower centres are matured, but not controlled by co-ordination of the high centres. In this way he accounts for birth traumatisms not giving symptoms till long after they take place.

He draws attention to the gradual reduction in size of the heart compared with the body. Exactly proportionate to this is the decrease in the speed of the circulation and heart. The heart is transverse at birth and the left border of it remains outside the nipple line, with the apex in the 4th space, until the fourth year. From the fourth to the ninth year the apex moves downward and inward to the adult position. The transverse position of the heart during the early years accounts for the apex beat being displaced upward and outward rather than downward and outward, as in the adult, if hypertrophy or dilatation have taken place.

The most striking feature of the child's heart is its recuperative power. On this account compensation may often be established after most serious breakdowns. On the other hand, alarming evidences of circulatory failure may accompany insignificant and transient disease.

The results of physical examination of the lungs of the child are somewhat different to those found in the adult. These are partly due to the thin elastic chest walls and partly to the relatively larger space occupied by the bronchial tree. Breathing is louder, expiration more nearly equal to inspiration, and has a broncho-vesicular quality. Relative dulness is normal at the right apex owing to the arrangement of the underlying bronchus. Intensified breath sounds at the apex are also more prominent than in the adult. Owing to this quality lesions in the apex may be more readily made out in the axilla.

Acetonuria often receives unwarranted attention in children. The latter often turn promptly to the oxidation of their stored fats. If there is not sufficient carbohydrate to complete their oxidation, acetone bodies result. This is seen especially in respiratory toxemias.

A. B. C.

Tuberculous Infection and Resistance in Infancy, Childhood and Adult Life. Cummins, S. Lyle: *Internat. Jour. Public Health*, September, 1920.

The writer, in seeking information on tuberculosis, quotes Nageli and Burkhardt, who give the results of post-mortem examinations in a long series of patients dying from all causes. These show that tuberculosis is extremely rare in infants and in young children, but becomes increasingly common with advancing age. Hamburger in his more recent work shows also by the post-mortem method results similar on the whole. Cummins quotes some of these in the following table:

	0–3 mos.	4–6 mos.	7–12 mos.	1–2 yrs	3–4 yrs	5–6 yrs	7–10 yrs	11–14 yrs
Total post-mortems...	105	73	140	179	175	67	65	44
With tbcs. lesions.....	4	13	32	74	102	38	41	31
Tuberculosis %.......	4	18	23	40	60	56	63	70
Post-mortems on cases dead of non-tuberculous disease..........	102	60	114	126	106	44	37	28
No. with tuberculosis as cause of death.....	4	13	27	51	69	23	28	16
% Deaths from Tbcs..	100	100	80	70	67	60	68	50

These figures, while showing higher percentage of tuberculous infection in infancy than previously recorded, confirm the figures of other observers. The lowest line of the table clearly shows the mortality is in inverse ratio to the age, *i.e.*, in the first few months, when the disease is rarest the mortality (100%) is highest and diminishes with age. Tuberculin reactions tell the same story as shown by von Pirquet and others. Metchnikoff, Burnet and Tarassevitch have had similar experience among Tartars, as the following table shows:

Von Pirquet tests among Kalmonk Tartars

	Children			Men
	0–5 yrs.	6–10 yrs.	11–15 yrs.	
	% positive	% positive	% positive	% positive
Central districts (isolated).....	13	32	56	64
Peripheral districts (contact with Russians...	30	63	83	89

The writer considers as "virgin soil" both infants and primitive tribes not in contact with civilized people. He also attributes the great resistance of most people in infected communities to immunity acquired in previous contact with the disease. Finally, all these figures confirm the belief that infection and mutual interaction explain the facts (without heredity).

F. M. F.

Cæliac Infantilism, Its Fat Digestion and Treatment by Bile Salts.

Miller, Webster and Perkins: *The Lancet*, October 30th, 1920.

Cæliac disease shows three cardinal features: (1) Enlargement of the abdomen without signs of organic disease; (2) Persistent or relapsing diarrhœa with pale fatty stools; (3) Retardation of physical growth and development. The stools are usually large, liquid, pale and offensive, and the dried fæces may contain 50 per cent. or more of fat. Moreover, the condition is not one of deficient fat-splitting, but rather one of deficient fat-absorption. There is no case on record in which the digestion of fat was so defective as to point to pancreatic insufficiency. Although the cause of this fat wastage is quite obscure, the authors decided to test the value of bile salts in promoting the absorption of fat. They gave one grain each of sodium glycocholate and sodium taurocholate (in an alkaline watery solution flavoured to disguise the intense bitter taste) three times daily with the meals. During the administration of bile salts the stools became drier and firmer and there was a definite improvement in the splitting, absorption and utilization of fat. At the same time there was an increase in the patient's weight. Such results were more striking during the stages of active diarrhœa, for during the quiescent periods fat absorption tends to automatic improvement.

The protocols of three cases are given with analysis and tables showing the results of fat metabolism both with and without the administration of bile salts. These results would certainly justify the trial of bile salts (or desiccated pig bile) in a condition so obstinate as cæliac disease.

L. M. L.

A Treatment for Colic in Breast-fed Infants.

Grulee, C. G.: *Jour. Amer. Med. Assoc.*, November 25th, 1920.

There is scarcely any condition affecting breast-fed infants more common than colic. While it does not materially injure the infant *per se*, it is nevertheless of importance owing to the disturbance to the household and because it is so often made an excuse for premature weaning.

Colic should be regarded as a symptom of overfeeding. This is generally due to an over-abundant milk supply although some hold that it is due to an excessive amount of fat in the milk. The condition nearly always is accompanied by pain and an accumulation of gas in the bowel. These symptoms are associated with fermentation and irritation of the intestine. The latter is generally due to excessive fatty acids. Grulee's plan is to change the fermentation so that lactic acid, which is non-irritating, may result, and to encourage putrefaction, which is antagonistic to fermentation.

If the child is getting too much milk the period of nursing is shortened. This simple procedure is not sufficient to cure many of the cases. When necessary he gives 5 c.c. of the liquid culture of active lactic acid bacilli morning and evening, and each breast feeding is preceded with a gram of powdered casein. When the latter cannot be obtained he administers the curd from an ounce of skimmed milk.

Occasionally the colic is due to a deficient amount of breast milk. Here supplemental feedings of protein milk are indicated. A. B. C.

The Early Orthopædic Treatment of Infantile Paralysis.

Segg, Arthur T.: *Boston Med. and Surg. Jour.*, November 25th, 1920.

The paper consists of a short statement of the methods of treatment found most successful in caring for the 1916 epidemic in Boston, and is based on a careful study of more than one thousand cases.

It is recommended that orthopædic treatment should begin as soon as the acute and febrile symptoms have subsided, in order to protect as early as possible the stretching of weakened muscles by their opposing groups. Active treatment by massage and exercise is not to be undertaken until the sensitive stage has passed. When there is extensive involvement the recumbent position should be maintained for two to three months. To allow the patient to sit up early is a mistake and results in deformity. For the same reason walking should not be allowed until the muscles have regained power sufficient to carry out their movements easily. The children should not be urged to walk. The cases most restricted showed the best recovery.

After the period of sensitiveness has passed, massage and muscle training are instituted, avoiding fatigue. To guide this properly an accurate diagnosis of the muscles involved is necessary. F. A. C. S.

Pathological Anatomy and Pathogenesis of Congenital Occlusions of the Small Intestine.

Rochet, Ph. and Wertheimer, P.: *Lyon Surgical*, September, October, 1920.

The paper presents a discussion of the way by which these defects arise. A pathological description of three cases which has recently come under the author's notice is given. All three showed mucous membrane lining a blind end both above and below the occlusion; while the muscularis and submucosa are continuous through the occluded section. The intestine above is dilated; the portion below is not only small, but retarded in its development, resembling the intestine of a four months' fœtus. After discussing various theories which have been suggested to account for the condition, the authors state their belief that the weight of evidence supports those theories which depend on a defect of development (Mackel, Tandler, Farstner). Early in embryonic life the small intestine is found as a thick homogeneous tube. The subsequent history shows two stages: The first is characterized by proliferation of endodermic tissue resulting in the blocking of the lumen by a solid plug of epithelial cells. The second is a phase of mesodermic activity in which this plug is invaded, vacuolated and by the coalescence of these vacuoles the lumen is restored. The failure to complete this latter process would explain the conditions found. The article is interesting, well worked out, and well worth reading. F. A. C. S.

A Note on the Dissemination of Spirochæte Pallida from the Primary Focus of Infection.

Brown W. H., and Pearce, Louise: *Arch. of Derm. and Syph.*, October, 1920.

Experimental work on rabbits shows that there is probably no appreciable time during which spirochætal infection is confined to the focus of entry. The conclusion drawn is that as soon as the spirochætæ enter the tissues, they begin to multiply and gain access to the lymphatics and blood stream, and are distributed over the body even before the initial lesion is noted. H. E. M.

On the Treatment of Lupus Vulgaris by the Liquid Acid Nitrate of Mercury.

Adamson, H. G.: *Brit. Med. Jour.*, July 24th, 1920.

The author speaks of a large number of cases which cannot be reached by the Finsen method or *x*-rays, and claims that we must still rely on older methods of cauterization, with or without scraping. He has used various caustics; among others, caustic potash, which acts well on the lupus nodules, but is apt to damage surrounding healthy tissue; and chloride of zinc which does not destroy neighbouring tissues to the same extent.

Recently, however, he has found the liquid acid nitrate of mercury more efficacious and rapid in action than any other caustic he has come across, and is surprised that it should have received so little attention up to the present. The cases he has treated with it have been of the following types: (1) Single small patches of non-ulcerating lupus. (2) Old cases of lupus, already treated, but with nodules still recurring. (3) Large ulcerated patches. (4) The common widespread type involving the nose, palate, lips and cheeks. The application is made with a swab of wool wrapped around a fine-pointed forceps. He paints freely for one or two minutes, keeping carefully to lupus nodules and patches, or ulcerated surfaces. No dressing is applied. A crust forms a few days after application, and in about a week this comes away, often leaving a healed surface. Sometimes a single application removes a lupus nodule, but one or two more may be necessary. There is a good deal of pain, especially some time after the application; in very widespread cases, involving the nasal passages, a general anæsthetic may be given; otherwise, small areas may be done at a time.

He does not claim complete cure, but thinks that the good results he has had justify a more general use of this remedy. H. E. M.

DERMATOLOGY

Malignant Degeneration in Benign Dermatoses.

Williams, C. M.: *Arch. of Derm. and Syph.*, August, 1920.

The writer thinks it impossible, at present, to estimate what dermatoses most frequently become malignant, but in reviewing them, he comments as follows:—

Vascular nævi never become malignant. As regards the pigmented type, opinions differ as to which kind degenerates. Bloodgood holds that it is the projecting type; Pusey thinks rather that it is those that are embedded. No statistics are available to decide the point, but Williams thinks it reasonable to remove projecting moles which are most liable to trauma. Electrolysis or freezing may be employed.

Senile keratomata are the most important as starting points for carcinoma, while statistics again are not available, the sequence is so frequent as to be noteworthy.

He points out the frequency of cancer of the mouth arising on the site of pre-existing leukoplakia, but does not conclude that the latter gives rise to cancer. Syphilis and tuberculosis very frequently lead to malignancy. The scarring of syphilitic ulcers of the tongue may lead to carcinoma of that region, but elsewhere, malignancy does not seem to follow the condition. He concludes that many causes lead to keratoses, which may show a tendency to undergo malignant degeneration. R. E. MacD.

Action of Radium on a Variety of Cutaneous Conditions.

Montgomery, D. W.: and Culver, G. D.: *Arch. of Derm. and Syph.*, October, 1920.

In the experience of these two investigators, radium gave prompt relief and cure in persistent fissures of the nares, lips and anus; favourable results were also noted in lupus erythematosus. In dystrophy of the nails, in seborrhoic eczema and in psoriasis there was marked restoration of healthy growth, and it also relieved the itching and induration of chronic eczema.

R. E. MacD.

Post-Mortem Report on Case of Lupus Erythematosus.

Low, R. C. and Anderson, R.: *Brit. Jour. of Derm. and Syph.*, November, 1920.

A detailed post-mortem examination was made in a patient with long standing lupus erythematosus, particular care being taken as regards the presence of any tuberculous infection. No evidence of tuberculosis could be found.

The patient suffered from chronic bronchitis and had foci of suppuration in the teeth. The writers comment on the fact that both the removal of the decayed teeth and the administration of vaccine containing streptococcus longus, improved the lupus.

R. E. MacD.

Protein Sensitization in Eczema.

Rannitz, M. A. *Arch. of Derm. and Syph.*, September, 1920.

Of seventy-eight cases of eczema treated with proteins, thirty gave positive skin tests, nineteen of the most ordinary foods being employed. Treatment lay in removing the food producing the reaction. Improvement was noted in the first week. In the cured cases no recurrence had been noted within one year.

R. E. MacD.

Treatment of Leprosy with the Dean Derivatives of Chaulmoogra Oil.

Macdonald, J. T. (Director of Leprosy Station, Kalihi Hospital, Honolulu): *Jour. Amer. Med. Assoc.*, November 27th, 1920.

Dr. MacDonald reports that since October, 1918, his hospital has discharged seventy-eight cases who are "no longer a menace to the public health". These have shown no recurrence to date. Their average stay in hospital was fifteen months. Dr. MacDonald and his associates have reached the conclusion that the nearest approach to a specific for leprosy lies in chaulmoogra oil or oil of gynocardium. It has been long used, but in the researches of Dr. A. L. Dean, of the University of Hawaii, and his colleagues, the ethyl esters of the fatty acids of the oil were used, and these placed the treatment on a far more certain basis. Treatment was given both intramuscularly and by mouth, the injection being regarded as the more important of the two. Emphasis is laid on the necessity of treating this disease in hospital, on account of the length of time required, the value of the encouragement patients gain by seeing others cured, and the degree of control that can be employed in keeping the patients segregated. The Dean derivatives have not yet been prepared in large enough quantities for general distribution. R. E. MacD.

News

ALBERTA

At the annual meeting of the Alberta Medical Association held September 22, 1920, Dr. Chas. Hunter of Winnipeg gave a clinic at which four patients suffering from endocarditis were presented. In two, diagnosed as belonging to the infective or malignant type, the disease began in France with fever, pain in the pericardium, and weakness. When presented at the clinic, there was marked enlargement of the heart in one case, but not in the other. In both a double murmur existed. Albumen and blood were present in the urine of both patients. There was also marked clubbing of the fingers and toes. No leucocytosis was present in either case. Osler's spots were present in one of the cases. These are small spots which vary in size from a pin's head to that of a small pea, and may or may not be raised above the general level of the skin. They vary in their hue of colour; the smaller and redder are generally seen in the fingers and toes. These spots are regarded as diagnostic of an infectious endocarditis. The diagnosis of an infectious endocarditis is made from the following symptoms and signs:

Fever which may be moderate; pallor, and wasting; aortic diastolic murmur and high pulse pressure is very suggestive; albumen and blood in the urine; clubbing of fingers and toes, and the presence of Osler's spots. Infective endocarditis may be present in the absence of fever, leucocytosis, positive blood culture, and enlargement of the spleen. These patients are very apt to develop signs of cerebral embolism, or infarcts in kidney or spleen.

The third patient had had an acute arthritis. Examination revealed signs of a mitral and aortic lesion, but there was no fever or enlargement of the spleen. The evidence of a valvular lesion, with a history of an acute arthritis justified a diagnosis of simple endocarditis.

The fourth patient had had an acute arthritis as the result of which a mitral lesion had developed. He had also been subject to fainting spells. Dr Hunter was satisfied that the fainting spells were not cardiac in orgin. He also expressed his opinion that dizziness as an isolated symptom was of no significance. He pointed out that in congenital heart disease a definite thrill was often present over third left intercostal space.

MANITOBA

The annual meeting of the Manitoba Medical Association was held at Winnipeg on November 17th, 18th and 19th and undoubtedly was the most successful convention yet held in this province. An intensive clinical drive of highly interesting cases was planned for one large meeting and maintained on schedule time daily from 9 a.m. to 12 with surprising success. At 12.30 p.m. by special arangement a buffet lunch was served after which the afternoon sessions were opened at once and carried through with crowded audiences.

The papers presented showed careful preparation and in several cases were followed by animated discussion.

The following papers were presented:

"Scope and Relations of Pysychiatry." Dr. C. B. Farrar, Ottawa.

"Diagnosis and Treatment of Tumours of the Urinary Bladder," E. J. Boardman, Winnipeg.

"Tuberculosis in a Prairie Province—A study in ætiology." D. A. Stewart, Ninette.

"Blood Transfusion," S. J. S. Pierce, Brandon.

"Acidosis, its Diagnosis and Treatment," C. R. Gilmour, Winnipeg.

"Drainage in Surgery," J. Halpenny, Winnipeg.

"The Value of Fluroscopy in the Diagnosis of Abdominal Conditions," L. J. Carter, Brandon.

"Serous Meningitis," Wm. Boyd, Winnipeg.

Books Received

HYGIENE OF COMMUNICABLE DISEASES. A Handbook for Sanitarians, Medical Officers of the Army and Navy and General Practitioners. By Francis M. Munson, M.D., Lieutenant Medical Corps, U.S.N., retired. 793 pages with illustrations. Price, $5.50. Publishers: Paul B. Hoeber, New York, 1920.

THE FORM AND FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM. Introduction to the study of Nervous Disease. By FREDERICK TILNEY, M.D., Ph.D., professor of neurology, Columbia University, and Henry Alsop Riley, A.M., M.D., associate in neurology Columbia University. 1020 pages; 591 figures containing 763 illustrations of which 56 are coloured. Price $12.00 Publishers: Paul B. Hoeber, New York, 1921.

Book Reviews

DIAGNOSIS AND TREATMENT OF BRAIN INJURIES. By WILLIAM SHARPE, M.D., professor of neurological surgery, New York Policlinic Medical School and Hospital. 757 pages, 232 Illustrations. Price $8.00 Publishers: J. B. Lippincott Co.

THE book is divided into three parts. In Part I is given a general discussion of the symptoms and signs of brain injuries, together with a detailed description of the method of examination recommended by the author. In chapters V and VI of this section the text for the whole work is set forth. This may be given in the author's own almost monotonously recurring phrase. "The proper use of the ophthalmoscope, and the measurement of the intraspinal pressure by means of the mercurial monometer." On the accuracy of his observations in the employment of these instruments the value of the book rests. By the proper use of the ophthalmoscope is meant the frequent examination of the fundi and the recognition of changes in the discs of less degree than that usually described as optic neuritis or chocked disc. These changes range from swelling of the veins, through blurrings first of the nasal, then of the temporal side of the disc, up to swellings of two diopters or more at which point the term choked disc is used. Such changes indicating increased intracranial pressure are stated to be found in 33 per cent. of head injuries; and, if supported by an increased intraspinal pressure are recommended as the guide indicating in what cases and at what stage of the case operative measures are to be undertaken. An intraspinal pressure of over 16 mm. of mercury as compared to a normal 5-9 it is stated calls for cranial decompression.

The reviewer feels sure that a similar class of cases examined at the Royal Victoria Hospital has shown so many exceptions to the reliability of the intraspinal pressure as an indicator of the danger from intracranial pressure, and so much uncertainty in justly estimating slight disc changes even by experienced ophthalmologists, that the slavish following of such guides would not be a safe practice.

Part II consists largely of the case histories of 130 patients who have suffered from brain injuries. About one-third were operated on either in the "acute" or "chronic" stages in accordance with the indications as detailed in Part I. The case reports are interesting, but too numerous to discuss. Part III deals with cranial injuries in new born babies, and older children. Spastic paralysis and defective mental development especially if progressive are stated to be due in many cases to a chronically "wet" or œdematous brain, the result of old intracranial hæmorrhage.

F. A. C. S.

HYGIENE OF COMMUNICABLE DISEASES. A Handbook for Sanitarians, Medical Officers of the Army and Navy and General Practitioners. By FRANCIS M. MUNSON, M.D., Lieutenant Medical Corps, U.S.N. retired. 793 pages with illustrations. Price $5.50 Publishers: Paul B. Hoeber, New York, 1920.

THIS work presents in a concise form the information now available on the epidemiology and management of communicable disease.

Part I deals with epidemiology, prophylaxis and sanitation. It includes chapters on the infecting and infesting agents, infection and immunity, dissemination and general prophylaxis, etc. It also deals with personal, military and naval hygiene and includes many of the lessons learnt during the war.

Part II considers in detail the different maladies, their causes and treatment.

The book will prove useful for ready reference, more or less complete information being easily available on all communicable forms of disease.

F. G. F.

THE SYSTEMATIC TREATMENT OF GONORRHŒA IN THE MALE. By NORMAN LUMB, O.B.E., clinical assistant, St. Peter's Hospital for Stone. Second edition, 123 pages. Price $1.75 Publishers: Lea & Febiger, Philadelphia and New York, 1920.

THE second edition of this extremely interesting booklet appears in slightly enlarged and improved form. In it the author describes his routine methods of examination and treatment of gonorrhœa in the male. The book outlines in a very excellent manner the treatment of an acute case, while the description of complications and of methods of examination and treatment of a chronic case is well done. Urethroscopic examination is dealt with by the author in another excellent book entitled: "The Urethroscope in the Diagnosis and Treatment of Urethritis". Two particular points are worthy of more extended comment. First: in acute cases, the irrigation treatment alone is recommended, according to the methods which have been in force in the British Army in recent years. Second: the use of vaccines is recommended equally in the acute and chronic stages of gonorrhœa. The author states that his view has been confirmed by an experience of some thousands of cases. He points out the difficulty of destroying by ordinary methods of treatment those gonococci which lie beneath the mucous membrane of the urethra and its numerous glands, and urges that vaccines, by increasing the bactericidal power of the blood are the best mediums for this purpose. He uses a mixed stock vaccine composed of many strains of staphylococci and gonococci. In this respect, the discovery by Thomson of a method of rendering gonococcal vaccines less toxic, and so permitting the injection of much larger quantities, may be of the utmost clinical importance in the treatment of gonorrhœa. This method depends upon the fact that gonococci are readily soluble in an alkaline medium. The toxin, which is an endotoxin is removed by dissolving in an alkali thoroughly emulsified cultures and reprecipitating them by neutralization. The precipitate consists of the gonococcus stroma less the endotoxin, which when injected gives rise to very little reaction. Injections are made commencing, with 2,500 millions and increasing to 10,000 millions. Clinical tests with detoxicated vaccines are so far very satisfactory, although the results in chronic cases using polyvalent vaccines have not been so striking.

F. S. P.

CARE AND FEEDING OF INFANTS AND CHILDREN. A Text-Book for Trained Nurses. By WALTER REEVE RAMSEY, M.D., associate professor of diseases of children, University of Minnesota. Including Suggestions on Nursing by Margaret B. Lettice, supervising nurse of the Baby Welfare Association. Second edition revised, 290 pages, with 123 illustrations. Price $2.50. Publishers: J. B. Lippincott Co., Philadelphia, London, and 201 Unity Building, Montreal, 1920.

THIS book which is intended for use as a textbook by nurses, is now in its second edition. The chapters on artificial feeding and general hygiene are exceptionally good. The chapter on child welfare has been entirely rewritten. The illustrations are numerous and excellent. We note with some surprise that in the technique for vaccination it is recommended the scratching be continued until the wound bleeds. This book will prove a valuable addition to the library of any nurse.

G. A. C.

SHORT TALKS ON PERSONAL AND COMMUNITY HEALTH. By LOUIS LEHRFELD, A.M., M.D., agent for the prevention of disease, Department of Public Health, Philadelphia. 271 pages. Price $2.00 net. Publishers: F. A. Davis Company, Philadelphia, 1920.

THIS volume consists of health talks, arranged in a short, concise manner in popular form, free from technical terms, so as to be readily understood by the average person of school intelligence. It is not intended, primarily, for physicians, but those who are engaged in public health work might find some help in perusing its pages. To-day, when we are all more or less interested in housing problems, and in child welfare, in efforts to prevent occupational and infectious diseases—in attempts to prevent industrial accidents—and in mental hygiene, this book appears at a very opportune moment.

The different subjects are discussed in a very short manner, but we recommend it heartily to physicians engaged in public health work, to public health nurses, and social workers.

G. S. M.

ANÆSTHETICS, THEIR USES AND ADMINISTRATION. By DUDLEY WILMOT BUXTON, M.D., B.S. Sixth edition, 548 pages. Price 21/-net. Publishers: H. K. Lewis & Co. Ltd., London, 1920.

IN this work, Dudley Buxton, covers his subject in an excellent manner so that the most learned would do well to read it carefully. Particular attention may be drawn to those parts dealing with shock with nitrous oxide-oxygen in major surgery, and with medico-legal aspects. There is one branch of anæsthesia in which his teachings are wanting, that of nitrous oxide-oxygen in obstetrics; very little space is given to this, whereas it is worthy of extensive discussion because it has occupied a most prominent part in the literature of recent years. In this connection he suggests the apparatus of Teter as modified by Gwathmey when there are other mechanisms more applicable.

W. B.

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THE PROGNOSTIC VALUE OF THE STUDY OF THE BLOOD CHEMISTRY IN THE ACUTE ABDOMEN

PRELIMINARY REPORT*

I. M. Rabinowitch, M.D.

THE rapid advances made in simplifying the technique of blood chemistry have opened new fields for investigation in many pathological conditions. For a time effort was centered chiefly on the study of the various forms of nephritis. More recently Tileston and Comfort in 1914[1] reported their observations made upon the non-protein nitrogen and the urea content of the blood in 142 cases of various pathological conditions; amongst these, there was one case each of strangulated hernia, acute intestinal obstruction, and paralytic ileus. The explanation offered for the increased non-protein nitrogen found in the blood in these cases was (a) that owing to stagnation of the intestinal contents there was a marked increase in the decomposition of nitrogenous elements in the intestinal canal, as evidenced by the increased amount of indican found in the urine, (b) that the increased absorption of poisonous substances from the intestines affected the renal function, and led to defective elimination, and (c) that the great loss of body fluids by vomiting led to a greater concentration of the non-protein nitrogen.

Prompted by these observations, Cooke, Rodenbaugh and Whipple[2] made an extensive study of the non-coagulable (non-protein) nitrogen of the blood in experimentally produced intestinal obstruction in animals. These authors demonstrated that the intoxication observed in intestinal obstruction was in a great part due to a proteose, which was comparatively easily isolated from the closed loop of intestine in animals by means of either 95 per cent. alcohol or ammonium sulphate, and was very toxic—100 milligrams causing the death of a dog weighing fifteen pounds.

This same proteose is apparently also present in the exudate from peritonitis in man, since the latter has the same toxic character as those found in the animal's closed loop. It has therefore been suggested by these authors that this proteose is the factor in the production of the toxic effects observed in human intestinal obstruction. Peritonitis and pancreatitis have some clinical features in common, and these cases were also studied. This proteose is not necessarily due to bacterial activity, since it can be found in the peritoneal exudate produced by injection of sterile turpentine, and in that pancreatitis produced by the injection of sterile bile. Associated with this increase in non-protein nitrogen in the blood, there was found, also, an increase in the urinary excretion of nitrogen of from two to three grams per day above the normal, and also, where the increased non-protein nitrogen was found in the blood, there was a good kidney function. The increased blood nitrogen found in the presence of a good kidney function, and a greater urinary excretion of nitrogen than would be expected from a local reaction, suggested to these authors that this was not due to defective elimination but to increased tissue destruction, and a high non-protein nitrogen in the blood should be a guide in the prognosis of the cases.

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*From the Department of Metabolism of the Montreal General Hospital.

That urea is toxic in itself has long been doubted since large amounts have been introduced into animals without producing toxic (uræmic) effects. This idea has lately been questioned[3]. Since the body has about five litres of blood it should only require the injection of about 10 gms. of urea to increase the concentration of the blood urea to 200 mgms. per 100 c.c. This does not occur. If, however, urea is given in sufficiently large quantities over the proper periods to maintain this level of 200 mgms. per 100 c.c. these observers have noted that toxic (uræmic) manifestations do occur.

Following upon these observations, a routine study of the blood chemistry was made in a number of cases admitted to the Montreal General Hospital having or suspected of having acute intestinal obstruction, acute peritonitis or acute pancreatitis. Examinations were made as completely as possible, but subject to the general condition of the patient, and it will therefore be noted that the data are rather fragmentary. The analyses made were of the non-protein nitrogen, urea nitrogen, creatinine, sugar, chlorides and cholesterol. The kidney function was judged by the excretion of phenolsulphonephthalein, and McLean Index of excretion (relation between the concentration of urea in the blood and the rate of its excretion). For the purpose of this communication, only the blood nitrogen and phenolsulphonephthalein excretion will be recorded.

The "day of disease" in each case refers to the onset of acute symptoms, disregarding the older history of ulcer, malignancy, etc. Where only one finding is recorded, the tests were not repeated, since the clinical picture did not warrant it.

·The normal figures are accepted as follows:

Urea nitrogen 12-15 milligrams per 100 c.c. Phenolsulphonephthalein 60-80 per cent. in two hours.

No. 2041, male, age eighteen, admitted May 4th with a history of three days' illness. Clinical diagnosis, ruptured appendix, general peritonitis. Blood urea nitrogen on admission and before operation 108 mgms. per 100 c.c. Operation on the night of admission. May 6th, general condition slightly improved, with enemata slightly effectual, wound draining well. Blood urea nitrogen 112 mgms. per 100 c.c. (increased four mgms.)

May 12th. Complains of abdominal pain. No change in general condition, enemata fairly effectual. Blood urea nitrogen 120 mgms. per 100 c.c. (increasing). Phenolsulphonephthalein 66 per cent. in two hours.

May 16th. Abdominal pain severe, marked distention, enemata ineffectual. Blood urea nitrogen 146 mgms. per 100 c.c. Died 2.00 p.m. It will be noted that the blood was showing a gradual increase in nitrogen while the clinical picture was not definitely changed. Also the kidney function was normal.

No. 3333, male, age sixty-eight, admitted July 22nd with history of four days' illness, with cramp-like pains in the abdomen, vomiting, and constipation. Clinical diagnosis, incomplete obstruction, inoperable carcinoma of the large bowel. Blood urea nitrogen 126 mgms per 100 c.c. The patient made a rapid downward course and died July 31st.

No. 2224, male, age twenty, admitted May 15th with history of seven days' illness. Clinical diagnosis, perforated duodenal ulcer, general peritonitis, ileus. Blood urea nitrogen before operation 110 mgms. per 100 c.c. At operation upon the same day, an ulcer was found in the superior portion of the second part of the duodenum, with perforation and a general peritonitis. The perforation was closed and a gastroenterostomy was performed.

May 17th. Slight relief of distention, enemata slightly effectual. Blood urea nitrogen 90 mgms. per 100 c.c. Phenolsulphonephthalein 64 per cent. in two hours.

May 19th. Marked distention, enemata ineffectual. Blood urea nitrogen 120 mgms. per 100 c.c. Died.

No. 3548, male, age forty, admitted August 15th, with history of two days' illness. Clinical diagnosis, perforated appendix, general peritonitis. Blood urea before operation 160 mgms. per 100 c.c. At operation the pelvis was found filled with fæces. Phenolsulphonephthalein 60 per cent. in two hours. Died.

No. 1975, male, age forty-three, admitted April 30th, with history of five days' illness. Clinical diagnosis, perforated appendix, general peritonitis. Blood urea nitrogen before operation 84 mgms. per 100 c.c. Operation the same night.

May 1st. Distention relieved, enemata effectual. Blood urea nitrogen 80 mgms. per 100 c.c.

May 2nd. Distention marked, enemata ineffectual. Blood urea nitrogen 80 mgms. per 100 c.c. Phenolphthalein 48 per cent. in two hours. Died.

No. 2226, male, age seventy-four, admitted May 16th with old history of constipation, and history of acute obstruction. The patient was in a moribund state. Blood urea nitrogen 84 mgms. per 100 c.c. Operation on the night of admission showed blood in the peritoneal cavity, collapse of the sigmoid, and thickening of bowel at the site of obstruction, with puckering of the mesentery. Colostomy, obstruction relieved.

May 17th. Blood urea nitrogen 84 mgms. per 100 c.c. Phenolsulphonephthalein 71 per cent. in two hours. Died. Pathological report: Sarcoma of bowel. Intestinal obstruction.

No. 3474, male, age sixty-two, admitted July 31st, with old history of hernia and history of acute obstruction. Blood urea nitrogen on admission 80 mgms. per 100 c.c. At operation the strangulated bowel after relief of the obstruction was œdematous, and only slightly viable. Operation, colostomy, bowel emptied, colostomy wound closed, lateral anastomosis.

August 1st. Some improvement in general condition, enemata slightly effectual. Blood urea nitrogen 77 mgms. per 100 c.c. Phenolphthalein 66 per cent. in two hours.

August 4th. Marked distention. Blood urea nitrogen 77 mgms. per 100 c.c. Died.

No. 1986, female, age twenty-two. Diagnosis, chronic valvular disease of heart, pregnancy.

May 1st. Therapeutic abortion. Intra-abdominal sterilization.

May 2nd. Suspected post operative obstruction. Pain in abdomen, distention, enemata effectual. Blood urea nitrogen 39 mgms. per 100 c.c.

May 3rd. Enemata effectual, blood urea nitrogen 30 mgms. per 100 c.c.

May 4th. Definite evidence of obstruction, enemata ineffectual. Blood urea nitrogen 51 mgms. per 100 c.c. At operation a coil of mesentery was found adherent to the cornu of. the uterus. Adhesions removed.

May 8th. Blood urea nitrogen 26 mgms. per 100 c.c.

May 9th. Blood urea nitrogen 16 mgms. per 100 c.c. Discharged well.

No. 2284, male, age seventy-six, admitted May 20th with history of two days' illness. Diagnosis, acute diverticulitus, pericolitis, acute obstruction. Enemata ineffectual. Blood urea nitrogen 142 mgms. per 100 c.c.

May 25th. Enemata effectual, distention absent. General condition improved. Blood urea nitrogen 35 mgms. per 100 c.c. This patient made an uneventful recovery, and subsequently underwent a two stage prostatectomy. Recovered.

No. 2150, male, age forty-nine, admitted May 11th. Diagnosis, perforated appendix, general peritonitis, ileus. Blood urea nitrogen before operation 20 mgms. per 100 c.c. This case in no definite way appeared different, clinically, from case No. 1975, except for the low blood urea. Discharged well.

No. 5075, male, age twenty-seven, admitted November 9th with history of one day's acute illness. Clinical diagnosis, perforated appendix, general peritonitis, adynamic ileus. Blood urea nitrogen before operation 22 mgms. per 100 c.c. The general picture of this case did not differ from that of No. 3548 except for the low blood nitrogen. Discharged well.

No. 4896, male, age thirty-seven, admitted October 27th. Clinical diagnosis, volvulus, acute obstruction. Blood urea nitrogen before operation 20 mgm. per 100 c.c. Discharged well.

No. 5561, female, age thirty-six, admitted December 20th with old history of gall stones and history of acute illness for thirty-six hours. Diagnosis, acute pancreatitis. At operation wide fat necrosis was found. Before operation blood urea nitrogen 54 mgms. per 100 c.c. Operation, drainage of gall bladder.

December 21st. Blood urea nitrogen 21 mgms. per 100 c.c.

December 22nd. Blood urea nitrogen 21 mgms. per 100 c.c. Note the fall in the urea after operation. This is the type of case in which a very unfavourable prognosis is given. Discharged well.

No. 5172, female, age thirty-five, admitted November 16th with a history of eleven days' illness. Clinical diagnosis, acute pancreatitis. At operation fat necrosis was found. Blood urea nitrogen before operation 54 mgms. per 100 c.c.

November 17th. Blood urea nitrogen 21 mgms. per 100 c.c.

November 30th. Cessation of bile drainage, mucous fistula. Blood urea nitrogen 20 mgms. per 100 c.c.

December 13th. Blood urea nitrogen 16 mgms. per 100 c.c.

December 23rd. Recurrence of symptoms of the original attack—vomiting, shock, tenderness in the epigastrium, and to the left, general abdominal rigidity. Blood pressure, systolic 105. Leucocyte count, 24,800. Blood urea nitrogen 26 mgm. per 100 c.c. During the night the bile broke through and drained copiously, clinical symptoms promptly relieved.

December 24th. Blood urea nitrogen 16 mgm.

per 100 c.c. (10 mgm. drop in twelve hours). Discharged well.

No. 5006, female, age eleven, admitted November 4th with history of three days' illness. Diagnosis perforated appendix, general peritonitis. Blood urea nitrogen before operation 40 mgms. per 100 c.c.

November 5th. Blood urea nitrogen 22 mgms. per 100 c.c. Discharged well.

No. 5456, male, age twelve, admitted December 7th with history of three days' illness. Clinical diagnosis, perforated appendix, general peritonitis. The patient looked profoundly ill, and in no way differed clinically from No. 2041. Blood urea before operation 21 mgm. per 100 c.c.

December 8th. Blood urea nitrogen 21 mgms. per 100 c.c. Convalescing.

Table on Cases According to Degree of Concentration of Blood Urea

Hosp. No.	Blood Urea Nitrogen	Phenolsulphonephthalein	Result
	mgm. per 100 c.c.	per cent. in 2 hours	
2041	146	66	Died
3333	126	12	“
2224	120	64	“
3548	104	60	“
1975	110	48	“
2226	80	71	“
3474	77	66	“
1986	51 on admission		
	16	..	Well
2284	142 on admission	..	
	35	..	“
2150	20	..	“
5075	22	..	“
4896	20	..	“
5561	60	..	“
5172	54	..	“
5006	14	..	“
5456	18	..	“

The diagnosis in all the fatal cases was corroborated by the autopsy findings.

The object of recording the cases in order of their degree of concentration of blood urea will be seen from a glance at the table. The striking thing noted is that all the deaths are grouped together at the top of the table. That the kidney function was normal as judged from the excretion of phenolsulphonephthalein suggests that this increase in blood nitrogen is not due as first suggested (1), to defective kidney elimination, but to increased tissue destruction. No. 3333 did show a low dye excretion but also had an advanced chronic nephritis.

Conclusions

From such a small number of cases studied it would be unwise to formulate definite conclusions. The following points are, however, suggestive:

1. In intestinal obstruction, whether mechanical or adynamic, in acute general peritonitis, and in acute pancreatitis, the blood urea nitrogen rises above the normal in spite of normal kidney function.
2. This rise in the blood urea is therefore due to increased tissue destruction and not to defective kidney elimination.
3. The tissue destruction is probably due to the toxic effect of a proteose absorbed.
4. The maintainance of a high blood urea nitrogen, in the presence of a good kidney function, is indicative of an unfavourable prognosis, in spite of the amelioration of the clinical symptoms.

This work was made possible through the cooperation of the visiting staff of the Montreal General Hospital.

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TOXÆMIAS OF PREGNANCY—EARLY RECOGNITION AND TREATMENT

T. B. Stevenson, M.D.

Wetaskiwin, Alta.

PROVISION for human health has been made by certain lines of fortification against disease both from within and from without. In the former case we shall divide these into three lines, namely: (1) The alimentary mucosæ. (2) The liver, and (3) the glands of internal secretions, or antitoxic glands, which are the supra renal capsules, the pituitary body, the thyroid glands, and in the fœtus the thymus gland, which was probably intended to destroy the entertoxines traversing the placenta and derived from the mother's blood.

The intestinal mucosæ acts both mechanically and chemically and the leucocytes exercise their usual function on the soluble and figured elements of the intestinal tract and guard against the toxic elements entering the capillaries. The intestinal mucosæ absorb the hexone bases and amino acids, thus transforming them into living and useful albumin by a vertible organic synthesis and thus rob the bacteria of their prey. Hence the intestinal mucosæ exercise, with regard to microbic poisons and outside of its passive rôle of filtrating membrane, a truly antitoxic and protecting function. The function of the liver cells is to withdraw from the portal vein the toxic substances which have escaped the mucosæ, or first line of defence, so as to prepare and deliver to the blood circulating throughout the organism substances which are slightly toxic to be eliminated more easily and without danger to the economy. Urea is formed in the liver at the expense of the amino acids and ammonia, the latter of which is very toxic. Uric acid is mostly formed in the liver at the expense of other toxic agents.

The glands of internal secretion should arrest the toxines passed by the mucosæ and liver.

A defect in the equilibrium or metabolism in the prenatal state may easily weaken any of these lines of defence. The condition of pregnancy requires that the system continue in its well balanced and fortified state. Fortunately in the majority of these cases gestation follows a perfectly physiological and untoward course. "At the same time," Williams says, "in no other condition is the border line between health and disease so less sharply drawn, since a very slight irregularity often suffices to convert a physiological and normal into a pathological and abnormal state. The general metabolism becomes profoundly modified during gestation, as shown by the fact that during the latter months of pregnancy, a pregnant woman stores up nitrogen and water to a far greater extent than at other times. Moreover it is probable that the excretory functions are more liable to serious derangement, since they are called upon to care for the waste products of the fœtal as well as the maternal organism. For this reason many women who are perfectly well at other times may suffer from the retention of certain metabolic products. Following the statement of Bouchard that all pregnant women suffer to a greater or less extent from auto-intoxication, certain French observers, notably Pinard and St. Blaise, advanced the supposition that all the abnormal manifestations of pregnancy rest upon such basis and that mild conditions, such as slight headache, salivation and certain skin eruptions on the one hand, to such serious diseases as eclampsia on the other, represent respectively the early and later stages of the one and same process, which they designate as hepatotoxæmia. Veit, of Germany, advanced similar views but held that all of the disturbances of pregnancy, from slight abnormalities of pigmentation to eclampsia, result from a cystolic process following the entrance of chorionic tissue and fœtal ectoderm into the maternal circulation. These views are being largely dispelled by later studies of toxæmias.

A static condition of the colon is found in all conditions of toxæmia, but this may be the result of autotoxæmia as well as a cause. Fatty acids may accumulate in the blood through any of the points of absorption and thus produce

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Read before the Alberta Medical Association, Edmonton, September 22nd, 1920.

an acidosis or diminution of the alkalinity of the blood. The greater part of carbonic acid in the blood is chemically bound so that the ability of the blood to absorb carbonic acid depends upon the alkiline reaction. The kidneys have for their mission the elimination of all excess of acid and that is why they are able to extract from the blood a liquid that is acid—the urine. But if the proportion of acids entering the blood is excessive the kidneys no longer suffice for the task of removing it. Hence this diminution of the alkalinity of the blood will lead to a toxæmia caused by the retention of the carbonic acid, the tissues being no longer able to rid themselves of it through the blood. This acidosis only occurs when the fatty acids are formed in excess in the system and it rarely happens except under faulty metabolism in breaking up and fermentation of the fats is particular. These poisons augment the condition of the pregnant women. This is likely due to the greater toxicity of the oxidized products, to the decreased internal secretion, diminished permeability of the kidneys and the fact that pigmentation of the skin is less favourable to elimination.

In consequence, the liver, subcharged with fat and glycogen, becomes insufficient. Splenic anæmia, by conveying blood pigment in exaggerated quantities to the liver, may render it insufficient from excess of work. The degree of anæmia in these cases is increased in proportion to the intensity of the toxæmia. Hæmoglobin may be diminished from 80 per 100 to even 50 per 100, and red blood cells running as low as 3,000,000, irregular in size, form and colour, while the white blood cells are increased.

The excess of entertoxines, by fatiguing the hepatic cells and irritating the blood vessels, gradually brings about insufficiency and produces a vicious circle, which may be noticed in the dyspepsia of this delicate state.

Septic absorption from the teeth, or pyorrhœa alvollaris may produce a septic condition in the kidneys and blood. It has been demonstrated that pus has been found in the kidneys in these cases similar to that found in cases of general septicæmia.

The pregnant condition is very susceptible to external conditions, as cold weather and environment. Cold seems to affect the equilibrium between the centres and the periphery of the body, paralyzing nerve centres and thus inhibiting the elimination by skin and kidneys and bowel. This loss of equilibrium caused by cold may produce an unstable condition of metabolism, producing an acidosis and a faulty elimination and resulting in stasis. Maternal oxygenation is decreased, lung expansion and heart action is disturbed, blood pressure raised. A depressing environment may also be a factor by nervous depression and the resulting inhibitory action. A cheerful environment should be the patient's.

This toxæmia may be recognized by copper blotches in face and body, red lips, pale face, dark streaks under eyes, odematous appearance, headache and malaise in the milder form to pernicious vomiting, yellow atrophy of liver, nephritic toxæmia or eclamptic toxæmia and even eclampsia in the more advanced stages. Blood pressure is a very important factor in diagnosis, as this may give a clue to the trouble several weeks before albuminuria is found.

The treatment is either prophylactic or curative. As prophylactic measures all focci of infection or septic absorption, such as defects of teeth, pyorrhœa alveolaris, tonsils, intestines, and kidneys should be discovered and eradicated. Bland, non-irritating diet recommended; no alcoholic or strong beverages or candy to be taken; seven or eight glasses of water taken daily; regular daily movements of bowels required; proper clothing to be worn, baths to be taken every other day and all worry removed.

Curative treatment will depend upon the condition of the case. Basham's mixture or Liq. Ferrit Amm. Citrate is a good form of iron to be given for the anæmia. Diuretics containing 10 grain doses of soda bicarbonate every four hours. Lemonade and magnesium sulphate and a milk diet may be given. In cases of threatened eclampsia the patient is put to bed, hot packs applied every eight hours, copious doses of magnesium sulphate given and put upon a strictly milk diet. If in thirty-six hours the hypertension does not subside and the albuminuria decrease it will be necessary to terminate pregnancy. In primiphora with hard cervix, much hypertension and a high percentage of albuminuria it might be well to resort to Cæsarian section, as in induced labour the toxæmia is accentuated, blood pressure raised and the patient weakened. Chloroform should be given sparingly if at all in these cases on account of its toxic and depressing effect but ether given instead.

Should eclampsia occur, large doses of magnesium should be given. Colon irrigation employed and hot pack applied. The stomach should be well washed out in one hour with 5 per cent. solution of soda bicarbonate and a Murphy drip of 5 per cent. solution soda bicarbonate and 6 per cent. solution of glucose employed. Veratrum vireli may be tried for steadying the heart action. Morphine sulphate ½ grain with atropine sulphate 1-100 grain or ether given to control spasms.

In conclusion, we might say that the termination of gestation, which is our last resort, will probably be our sheet anchor until prophylaxis by education and instruction so elevates the mass of the people that these states of toxæmia during pregnancy will be rare instead of relatively common.

THE EPIDEMIOLOGY AND DIAGNOSIS OF ENCEPHALITIS LETHARGICA

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MUCH confusion has arisen through our misconception of the terms Epidemiology and Epidemiological relationship, the endeavour of the epidemiologists to prove to us that the epidemics of encephalitis, of poliomyelitis, cerebrospinal meningitis and influenza, have frequently occurred in close relationship in the world's history, has led to quite unlooked for conclusions.

The epidemiology of encephalitis is inextricably bound up with that of polio-myelitis and with that of cerebro-spinal meningitis and of all in turn has it been said that they preceded, accompanied or followed some more or less generalized febrile epidemic, influenza-like in its symptoms and character. An undoubted epidemiological relationship does exist, however, and in four hundred years of records of medical history there are to be found many interesting accounts of epidemic paralyses, stupors, and vague nervous disorders, occurring in more or less close connection with generalized waves of infections which are considered to have been influenza; in many instances the epidemic nervous disorders preceded the outbreak of the more widespread, grippe-like fevers; paragraphs from Hippocrates would well describe the epidemiologic relationship of encephalitis and influenza in England in 1918 and is no less applicable to the state of affairs in Canada in the winter of 1919-1920.[1]

Encephalitis as a specific disease and not merely as a complication of some acute infection has been identified, to the satisfaction of the epidemiologists at least, for several hundred years,* one fairly conclusive detail is always of material assistance in the identification—epidemic paralyses are rare at best,—the meningitides, poliomyelitis encephalitis, and the food poisonings practically comprise the whole class, the epidemiology of these three is strangely similar and seems as regards all of them to be closely bound up with that of the more or less well recognized sweats and catarrhal fevers of the middle ages. Perspective and elapsed time have had much to do with the developement of the idea that encephalitis depends in any way upon some preceding infection.

Realizing these points it seems better to come quietly down through the ages, to admit the many interesting associations of the many obscure affections of the nervous system with each other and with other epidemic disorders, but to reserve one's critical analysis for the age of more accurate observation; to one epidemiologist for example, deductions in such a well-known disorder as influenza, are to be considered unreliable if drawn from description made prior to the great epidemic of 1889-90,[2] much the same can be said of encephalitis lethargica; the conditions de-

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* According to Hecker, "Hauptkrankheit," "The head disease," a pernicious fever with inflammation of the brain, was well recognized in Germany and referred to long before the sixteenth century. He regularly refers to it as encephalitis. He considers an epidemic in France in 1482 as encephalitis but the description would fit any acute infection.

scribed may have been and have been cerebrospinal meningitis, poliomyelitis, food poisonings, or simply the severe nervous type of many different fevers. The references made to "epidemic paraplegias occuring in a winter season and preceding a burning fever of the spring,"[1] may be taken as an example of early epidemiological association, an association, one part of which the "epidemic paraplegias" seems likely to have been encephalitis, poliomyelitis or meningitis, and through the centuries one finds many such records of the occurrence of what may have been this supposedly new disease "Nona" of the last few years.[3] As already mentioned, the fact which most impressed itself upon the early writers was that these disorders seemed to recur in such close relationship to the sweats and catarrhal fevers, the commonest epidemic disorders of the dark and middle ages, and some of which undoubtedly were the ever returning waves of influenza in its many forms. Needless to say but few reliable details exist from these centuries.

It is not till the 15th century that we can make much use of described conditions: 1481–2, 1528–9, were again years of suggestive association of paralytic diseases, diseases the main features of which were "somnolence and inevitable stupor,"[4] with the constantly recurring sweats; of more than passing interest is the attempt in the 16th century to show that the cause of some of these epidemic paralyses was some food intoxicant, fish or rye (ergotism), and from this time on we have the state of affairs as in 1918—epidemic paralysis, ergotism (raphania), (mal mazzucco), as a diagnosis, like the botulism of to-day, and with the influenza preceding or following.

Epidemic stupor 1545–6 and the head pain in Germany in 1543–46 are put forward by some writers as encephalitic manifestations, these conditions may have been almost anything, they seem at least to have existed apart from other epidemics; to call a disorder of 1567 an "avant-coureur" of the great influenza of 1580, is a kindness to history, it does service, however, in showing again that even if, "during the winter and at the beginning of spring there was a "quantity innumerable of paralyses" that at least they seemed to have an independent existence.[5]

1595 saw the "Krielblekrankheit" co-existing in Germany with epidemic catarrh, this disorder, like the mal mazucco of the Italians, was usually ascribed to food intoxication, and the history of botulism, ergotism, raphania (the radish disease), begins at this time; without doubt much confusion existed, the paralyses occurring epidemically must have puzzled the observers of the day, and one recollects that in 1918, boltulism was the diagnosis made in England for the first cases of encephalitis, to be followed by the actual occurrence of botulism in the United States.

Nearly half a century later, 1657, the cycles of the various diseases we have been above referring to cut into each other again; influenza of 1657–8 "affected man most grievously in their brains and nervous stocks" according to Willis, and epidemic lethargics existed at Copenhagen; four years later, Willis's fever "infestuous to the brain and nervous stock" is described. Willis is said to have identified this fever with the German Krielbelkrankheit, no very close association with preceding or following catarrhs is noted with this rather definitely labelled disorder.*

Two hundred years of epidemiological relationships between sweats, influenza, and the several erratically described disorders of the nervous system, bring one to a point where the confusion caused by epidemiological deductions becomes very evident; Heine's description of infantile paralysis appeared in 1834–5, epidemiological associations of infantile paralysis with catarrhal fevers and influenza is recognized at once, associations which like those of encephalitis lethargica allowed the nervous disorder to either precede or follow the more general epidemic, with as much reason as is used in discussing the ætiology of encephalitis, could one ascribe infantile paralysis to the virus of influenza.

At this period of medical history, symptoms of specific fevers due to involvement of the nervous system, and such conditions as ergotism, botulism, cerebro-spinal meningitis, encephalitis, poliomyelitis were but indifferently differentiated, the epidemiology of all the latter conditions is hopelessly obscure; approaching our own times some clearer epidemiological light is shed, it is a delight to read, as above mentioned, in one author's detailed account of the occurrence of influenza "that for practical purposes the epidemiologist must not begin his study earlier than 1889–90,"[6] it is quite apparent from the history of all epidemics that in many instances cerebral complications have been magnified into new diseases as seen in some influenzas, typhoids, pneumonias, it is also just as apparent that cerebro-spinal meningitis and poliomyelitis have frequently been confused with encephalitis: ergotism in the earlier years, and in the later years, botulism, have added materially to the difficulty of determining a clear history of the epidemiology of encephalitis.

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* The description by both Sydenham and Willis is of a disease much resembling typhoid, both give post mortem details, however, and the absence of intestinal lesions is commented upon by Creighton. There is no distinct resemblance to the present day encephalitis.

By the end of the 19th century clinical medicine in its progress was beginning to show its influence on public health problems, poliomyelitis, well identified, seems to displace encephalitis in its frequent associations with the ever returning invasions of influenza, though the existence of the whole group of epidemic paralyses, raphania, ergotism, botulism, meningitis, is still evident in many quarters, this was the condition in 1844–5; the year 1847 can be taken as one in which we could not have spoken of encephalitis as connected in any way with an influenzal infection for the great epidemic of that year, a catarrhal type, was followed by no outbreak of diseases of the nervous system, a few years later the cause of the present day confusion is well demonstrated, influenzas of 1850–51, 55–57 were of the nervous type and in 50–51, botulism, encephalitis "spinal and bulbar forms of typhoid" which may have been poliomyelitis were described as prevalent in Europe.[7]

During the next thirty years repeated appearances of all the acute disorders of the nervous system are noted, more or less intimate association with influenza is still to be seen, but an association again in which they all claim equal intimacy, and Crookshank tells us that in the years so often referred to as being years demonstrating the identity of encephalitis lethargica and influenzal infection, (1889–90), poliomyelitis preceded the influenza in Sweden, meningitis as a "new disease" went hand-in-hand with it about the Mediterranean and "Nona" or encephalitis followed it in Lombardy and Hungary;[8] the history of the ages repeated, but with some slight shifting of the places occupied by the three diseases, infectious disorders whose epidemiology is strangely similar.

A few years later, 1895, one finds the suggestion made that polio-encephalitis co-existing with a local epidemic of grippe at Toulouse is merely an intense form of "grippe nerveuse" but in the far north east of Europe poliomyelitis was epidemic at Stockholm co-existing and following a minour outbreak of influenza while VanErmengen at the same time by his discovery of the bacillus botulinus showed clear that an occasional epidemiological relationship is no proof of ætiological idenity. From this time on it has seemed possible to determine what for many centuries must have confused many clinicians, namely, that the epidemic paralyses so often referred to, so often associated with other epidemics were of four distinct types, poliomyelitis, cerebro-spinal meningitis, the food poisonings, (botulism, raphania, mal mazucco, kriebelkrankheit,) and the condition we are to-day discussing, encephalitis lethargica. The last few years have shown the history of disease repeated in concentrated form, the possibilities of epidemic extensions have been manifold; with the gathering of our armies, influenza and pneumonia began in England in October. December, 1914, a year later, but almost unnoticed came marked rises in the incidences of the excess death rates in the respiratory diseases in the United States; these sharp rises usually staged between December and May are to the epidemiologists but indications of influenza recrudescences:[9] for these minor waves of catarrhal fever, the associated condition, as far as disorders of the nervous system were concerned, was cerebro-spinal meningitis; complications involving brain and cord were uncommon with the influenza and the organism of meningitis was easily identified, epidemiological relationship expresses best the state of affairs: 1917 saw the beginning recognition of encephalitis, independently in Australia (whose troops, however, were returning from the Mediterranean basin), coincidently in Austria with respiratory diseases near what may be called the home of the disease, Lombardy and Hungary (Flexner): spreading through France and England and before the epidemic influenzas of 1918, encephalitis was either an after-comer of the unrecognized influenzas disguised as "respiratory diseases", or a fore-runner of the great triple-waved epidemic. It was existing as botulism in England before the convalescents of the first wave of influenza were returning from French hospitals, and was appearing in Canada and America before the ghastly plague of the autumn of 1918 (Thistle); a full year later, extending and appearing like poliomyelitis it preceded the influenza epidemic of 1920, lasted through it and has persisted rather in lessening than in increasing degree. Epidemiology is not ætiology, the purpose of these remarks is only to show that recently, as in the centuries gone by, diseases which may have been encephalitis lethargica have existed and of necessity must have frequently coincided in their appearance with the ever recurring epidemic catarrhs and fevers. Should the view held by many, "that encephalitis is but a manifestation of influenza" be correct, then the virus of the latter disease has probably been discovered by investigators working successfully in the ætiology of encephalitis lethargica. No such claim has been put forward by them, and one can safely say that epidemiology not ætiology is the real bond of relationship between influenza and encephalitis lethargica.

Diagnosis. With the course of time and in the light of clear observation the diagnosis of encephalitis lethargica has become steadily more comprehensive and yet less difficult. Bearing in mind the pathology of the disease "hæmorrhages gross or microscopic in any part of the nervous system and attended with the specific alteration of the blood vessels, plus at times the signs of acute congestion and inflammation of the brain" one realizes that of necessity a multiform symptomatology must exist as regards the nervous system at least. A symptomatology which though largely of the motor centres or tracts has shown many signs referrable to the sensory and psychic areas. The history of the onset of the disorder, either acute, with signs of an active general infection, fever, delirium, or at least with a well-defined initial stage, serve at once to distinguish it from the chronic degenerations of the nervous system, it is to be noted that already the suggestion has been made that encephalitis lethargica is the primary factor in some cases of insular sclerosis. This history of onset is all important, the encephalitis, local or diffuse, associated with sepsis, endocarditis, syphilis, cerebro-spinal meningitis, tuberculous meningitis, brain tumour or abscess may produce a picture indistinguishable from the specific encephalitis. The cerebral form of polio-myelitis, the encephalitis following mumps, scarlet fever, influenza differ from encephalitis lethargica only in the history of a defined preceding infection, and in the case of polio-myelitis in the ready detection of the ætiological agent..

Next in importance to the history of onset, stands the course of the disease in the deducing a diagnosis of the encephalitis in question. Convulsions, spasms, ridigity of neck, sensory disturbances, paralyses or pareses of the cranial nerves, perhaps associated with somnolence or lethargy and with a history of more or less sudden febrile onset usually suggests the cerebral manifestations of acute infections, or

(1) Cerebritis or abscess
(2) Tuberculous meningitis
(3) Cerebral syphilis
(4) Cerebro-spinal meningtis
(5) Botulism
(6) An encephalitis
(7) A neuritis (infectious)
(8) Tumour
(9) Pachymeningitis
(10) Hæmorrhage
(11) Uræmia
(12) Comas

and the course of all these conditions may be very similar up to a certain point, for since the hæmorrhages of encephalitis may occur anywhere in the nervous system or its membranes, it is quite evident that any symptoms may be looked for, improvement in the general condition and recovery from the several severe signs of involved nervous tissue without specific treatment must always suggest encephalitis lethargica: the associated conditions of botulism are different, in many instances the encephalitic manifestation is largely neuritic, (c. f. the radicular form as described by the writers of to-day) recovery from the tuberculous meningitis and cerebritis is rare to a degree, some recovering cases of cerebro-spinal meningitis with clear spinal exudate may leave one in doubt, though in these cases the increased polymorphonuclear cell count in the exudate may help. The progressive course of untreated abscess and tumour and the more marked optic nerve changes of' these conditions should be borne in mind, a pronounced condition of choke disc is rare, atrophy is almost unheard of in encephalitis, the history of onset is all important. Uræmic conditions and the various comas have usually diagnostic features of their own.

On a careful consideration of these two above mentioned points, the history of the onset and the course of the disease may depend and usually does depend the diagnosis of encephalit's, a certain sketchy classification into types has been attempted, we no longer consider simple cases showing fever, ocular pareses and lethargy as typifying the disease. Any epidemic will show

(*a*) Acute fulminating cases, with fever, delirium, convulsions, or apoplectic symptoms, suggestive of a general infection with diffuse cerebritis or hæmorrhage, few or no localizing signs may be present.

(*b*) Severe or mildly infected cases showing pareses or affection of cranial nerves with or without lethargy: during an epidemic many cases of mild, suddenly developing, ocular and facial paralyses are noted to occur.

(*c*) Cases with distinct bulbar symptoms.

(*d*) Cases showing symptoms suggestive of involvement of the basal ganglia (optic thalami, caudate nucleus) lethargy, paralysis-agitans like symptoms, athetoid and choreiform movement, localized spasmodic movements: in these cases it is suggested that small hæmorrhages are interfering with the controls of the cortical centres, the acute imitation of paralysis agitans, chorea minor and chorea insaniens has been a feature of many epidemics.

(*e*) Cases showing acutely developing hemiplegic, monoplegic, paraplegic symptoms, more usually spastic,—as if affecting the upper neuron, these are distinctly less common.

(*f*) Cases with cerebellar symptoms.

(*g*) Cases with marked psychical symptoms.

(*h*) Cases with marked meningeal symptoms, with clear or hæmorrhagic exudates, pachymeningitis.

(*i*) Cases with symptoms suggestive of sensory tract involvement.

(*j*) Cases showing symptoms of polyneuritis and posterior root involvement with pain, the radicular type.

(*k*) Poliomyelitic like cases.

As seen, the diagnosis in any of these forms must depend in many instances upon history and course. The fact that an epidemic exists; the more or less sudden onset with symptoms of an infectious disorder; the tendency in many cases to complete recovery from a disease with distinct signs of a multiform involvement of the nervous system are all important points; "diagnosis can never depend upon the presence or absence of any sign, symptoms or group of signs or symptoms."[10]

Certain clinical details and process of examination may help. The tendency to complete recovery has been mentioned: This may be delayed year long. The multiform involvement, a tendency towards relapses, the persistence of lethargy with continued well being, slight fever, are important in the summing up. A point strongly insisted upon as suspicious of infection by the encephalitis virus is the occurrence of signs of cerebral hæmorrhages in younger persons not syphilitic and showing no gross signs of arterial degeneration.

Cloudy spinal exudates and those showing increased polymorphonuclear cell count with bacteria usually belong to other conditions. The findings in encephalitis lethargica more regularly show a slight increase in mononuclear elements in a clear fluid, hæmorrhagic exudates may occur and hæmorrhagic pachy-meningitis appears in a new light, one hardly needs to touch upon the necessity of a Wassermann test or of a careful search for the presence of tubercle bacilli in the spinal exudate and signs of tuberculous disease elsewhere.

The absence of leucocytosis may be of use when debating the qusstion of abscess or meningitis, the results of animal inoculation may help distinguish encephalitis from poliomyelitis and possibly we may shortly see that encephalitis itself may be diagnosed by this means, the washings of the nose and throat, the ground up mucous membranes being said to produce specific changes in certain animals.

Finally it may be said that the diagnosis can often only be made post mortem by the study of the affected tissues, this is particularly true of the gross hæmorrhagic form and no case of hæmorrhage in the nervous system in a young adult should escape histological examination of the brain vessels.

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1. Hippocrates.—Quoted by Crookshank, *Boston Med. and Surg. Jour.*, January 8th, 1920.

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3. Creighton, Crookshank.—History of Epidemics in Great Britain.

4. Schuller.—Quoted by Crookshank.

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6 McLaughlin.—*Loc. cit.*

7 Crookshank.—*Loc. cit.*

8. Crookshank.—*Loc. cit.*

9. McLaughlin.—*Loc. cit*

10. Buzzard.—*Brain*, 1920.

11. Hecker.—Epidemics of the middle ages, Sydenham Soc., 8143.

Hecker.—New Sydenham Society Reports 1846, gives many of the details quoted to-day as evidence of the existence of encephalitis contemporaneously with epidemics of other general infections in the middle ages and later, his interesting chronological tables give many references to its existence, the epidemilogical relationship to the Sweats is the most apparent feature fact.

BLOOD TRANSFUSION

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IN any surgical measure efficiency should not be sacrificed to simplicity of technique, but where two or more methods equally efficient are available the final choice will be in favour of the least complex. The technique of blood transfusion is essentially simple. Indeed, if it were not for the fact that blood is a coagulable fluid it would be scarcely more complex than an injection of salvarsan, but chiefly on account of this awkward characteristic of the transfused fluid, and to the seemingly multitudinous methods of overcoming it, medical literature appears to overflow with varieties and sub-varieties of ways of transfusing blood. Opinions as to the best method are still in a state of flux; the final choice has still to be made.

However, in selecting a method adapted to general practice a candid survey of the field will soon convince one that many if not most of the methods are not adapted to general work and are destined finally to serve as little else beyond a monument to the ingenuity and skill of their brilliant originators. Consider the position of a physician in civil practice in the country. In selecting a method of blood transfusion there are certain limitations incidental to his own facilities or lack of facilities and to the class of case that he may be called upon to serve which definitely circumscribe his choice.

1. He cannot depend on much skilled assistance. The brilliant team work applied in military practice is not for him. It must be largely a one man job.

2. He must not depend on pieces of special apparatus that are fragile and difficult to replace, or on special mechanical appliances which are difficult to sterilize or which have to be in frequent use to be kept in shape.

3. He will note that cases of acute hæmorrhage such as are common in military practice are uncommon in his own practice. Most of his cases will be more or less chronic anæmias such as pernicious anæmia, cachexia following cancer or chronic sepsis, or anæmia following prolonged metrorrhagia. These will require multiple transfusions, often from the same donor. Hence any method that involves the destruction of the superficial vessels of either recipient or donor will be unjustifiable, or at least undesirable. If for no other reasons than those enumerated, a number of methods are at once excluded, namely, the older methods of arterio-venous anastomosis; the numerous brilliant methods involving the use of various paraffined containers, and the many ingenious devices consisting of special syringe with check-valves, 2 and 3-way taps, etc., and the choice is confined to a method involving the use of needles instead of canulæ and some simple method of delaying or inhibiting coagulation. These are essentially two in number. First, there is the method of transfusing unaltered blood by a series of small syringes described and used by the late E. Lindeman, and the second is the citrate method with which the name of Lewisohn is associated. The former is excellent, and is doubtless destined to be widely used, but has the disadvantage that a special form of needle is required as the ordinary needle cannot be held in place while the syringes are being changed and manipulated, and secondly, several assistants familiar with the method are required. His choice would therefore seem to be limited to some form of the Lewisohn method. That this in its original form is open to objection is seen by the appearance of several attempts to modify it. It will be remembered, that the blood from the donor is allowed to flow from a large needle into an open vessel containing citrate solution and is stirred constantly with a glass rod. The objection appears to be the exposure of the blood to the air, and several methods are described in which it is drawn into closed containers. One of the most ingenious of these is that described by Far and Gilroy (*Surg. Gyn. and Obstet.*, March, 1919). This avoids exposure of the blood but in practice not infrequently results in failure from the formation of clots in the collecting tube. This objection is overcome in the Robertson method described by J. E. McCartney (*Edin. Med. Jour.*, September, 1919).

But this again is open to objections incidental to any method using a large flask and many tubes, *i.e.*, it is fragile, not easily cleaned, and difficult to sterilize and transport.

In a series of thirty-five transfusions during the past ten months, the writer has used with success an extremely simple form of technique of which most of the essential features are suggested by A. Zingher (*Med. Res.*, July 13th, 1918). The apparatus consists of the following articles: (1). Two ordinary Yale or Paris needles, length one and one-half inch, gauge seventeen, carefully sharpened and with the lumen paraffined. One is attached to about five inches rubber tubing, and the other to about eighteen inches rubber tubing in which at about one and one-half inches from the distal (or needle) end is a short length of glass tube as in an apparatus for administering salvarsan. These are placed in wide test-tubes and sterilized immediately before use. (2). Five, four ounce bottles such as are used in ordinary dispensing, preferably those that are graduated in ounces and cubic centimetres. These are filled to the 20 c.c. mark with citrate solution freshly made up with water distilled immediately before and containing soduim citrate 1·8 per cent. and sodium chloride 0·85 per cent. These are loosely fitted with corks covered with gauze which is held in place with rubber bands and sterilized. (3). One, six ounce bottle containing 0·3 per cent. sodium citrate in saline prepared as above. (4) One bottle whose size may be anything from six to sixteen ounces, in the neck of which is inserted a small funnel containing a small piece of gauze. The funnel and bottle neck are covered with gauze and the whole sterilized (5). One graduated funnel such as is used in administering salvarsan with both ends capped with gauze and sterilized. (6). A tourniquet consisting of a short length of tubber tubing. Hypodermic syringe with a few drops of 2 per cent. cocaine or other local anæsthetic. Sterile gauze and alcohol.

Compatibility tests are made as follows:

From the recipient blood is drawn from the arm vein into a Keidel tube as in taking a specimen for Wassermann test and set aside in a warm place to clot and the serum to separate. From each of the prospective donors blood is drawn from the ear-lobe as in doing a blood count. One or two drops are received into about 2 c.c. 0·3 per cent. citrate solution and centrifuged. The clear citrate solution is poured off and replaced by normal saline and again centrifuged, the clear saline poured off, and the remaining emulsion of washed corpuscles used for the test. At each end of a microscope slide is placed a drop of the emulsion of donor's corpuscles. With one is mixed a drop of the recipient's serum and a cover-slip is applied to each. The one is the test, the other is the control. The preparation is examined immediately under the low power objective. Where bloods are compatible no change takes place in the even distribution of the corpuscles except for a little rouleaux formation, even after observation extending over one-half hour; but when incompatible, agglutination commences at once and can be hastened by gently agitating the corpuscles by pressure on the cover-slip. It is to be noted that the corpuscles of the donor are tested against the serum of the recipient and not in reverse order.

A suitable donor having been selected, the transfusion proceeds as follows:

The donor may report at the office where the blood is taken to be injected at the hospital or patient's home later in the day. But if there be no reason to the contrary it is usual for the donor to report at the hospital shortly before the time set for the transfusion. It is not at all necessary, however, that donor and recipient should be in the operating room together. The arm of the donor is exposed, and the tourniquet applied temporarily to determine which is the most accessible vein. The skin is then cleansed with alchohol and a few drops of 2 per cent. cocaine or other local anæsthetic injected intradermally at the site of puncture. (There is a distinct advantage in the use of the anæsthetic as the needle is large and with no anæsthetic produces enough pain to cause most patients to flinch. This interferes materially with the successful placing of the needle in the lumen of the vein.) The tourniquet is re-applied with just sufficient pressure to compress the veins without interfering with the radial pulse. From the needle attached to the short length of tube the stylet is gently removed so as not to disturb the inner coating of paraffin, and the needle inserted into the vein through the anæsthetized area. The blood is received into one of the four ounce bottles and the others in succession until they are all filled. As each is filled it is recorked and shaken. The donor is now dismissed. As four ounces is equivalent to 120 c.c., each bottle when full contains in addition to the 20 c.c. of diluent, 100 c.c. blood. The total volume of diluted blood is 600 c.c., and contains 1·8 gramme sodium citrate. If the blood is to be stored or transported it is left in the small bottles until required. Otherwise the gauze covering the funnel in the large bottle is removed and the blood passed through the small gauze filter, thus removing any clots which may occasionally occur. Meanwhile the arm of the recipient is prepared in the same way as that of the donor. The long length of tubing is attached to the salvarsan funnel and the stylet removed from the needle. The tube and lower end of the funnel are filled with 0·3 per cent. sterile citrate solution, and when the solution is running freely from the needle its butt is grasped by the finger and thumb which at the same time pinch the rubber tube immediately behind so as to check the flow. The funnel is now lowered below the level of the recipient's arm and the needle inserted into the vein. At the same time pressure on the tube behind the needle is released, and as soon as blood is seen to flow into the short length of glass tubing the funnel is raised to the full length of the tube and is filled with the filtered citrated blood. The time taken to administer 600 c.c. of diluted blood is usually from twenty to thirty minutes. The needle puncture is sealed with collodion and the patient warned of the possible occurrence of a slight rigor but reassured that no harmful results will follow.

Using this technique the writer has to report thirty-five transfusions in amounts varying from 200 to 600 c.c., with an average of 415 c.c. The greater number were done in the dressing room of the hospital, five in the patient's home. There were no mishaps, and practically no difficulty other than would be attached to an injection of salvarsan by the older method. The only assistant was the nurse who happened to be on duty at the time.

The chief causes of failure in any method of blood transfusion are associated with the unavoidable tendency of blood to coagulate. This may take place at three sites:

1. In the needle while extracting blood from the donor.
2. "En bloc" after the blood has been drawn.
3. In the form of clots or flakes of fibrin in the citrated blood which may float into the needle during injection and occlude it.

With the technique described the first is avoided by paraffining the interior of the needle. This is easily done by inserting a small plug of solid paraffin into the butt which is heated in the gas flame. The wax is run into the lumen of the shaft by means of the heated stylet which is finally left in place while the needle cools and is not disturbed until immediately before use. With this technique a much smaller needle can be used (seventeen gauge instead of fifteen gauge recommended by Zingher). The second is avoided by the use of small containers which insure a rapid and intimate admixture of the anti-coagulant with the blood, and by the use of a somewhat larger quantity of citrate which gives a concentration of 0·3 per cent. in the final dilution instead of 0·2 per cent. as recommended by Lewisohn. The last difficulty is adequately met by filtering the diluted blood through sterile gauze immediately before use.

A serious objection to the citrate method of blood transfusion is the not infrequent occurrence of reactions. This may consist of a rise of temperature sometimes as high as three degrees, with occasionally a rigour and vomiting. These occur in spite of meticulous care in the preparation of solutions. All observers note them. W. C. Hunt (*Texas State Jour. Med.*, September, 1918) reports 20 per cent. in 693 transfusions; A. L. Garbut (*Jour. Am. Med. Assoc.*, January 4th, 1919) 48 per cent. in 100 transfusions; R. Lewisohn (*Am. Jour. Med. Sci.*, February, 1919) 40 per cent. in 200 cases, and Drinker and Brittingham (*Archive Int. Med.*, February, 1919) report eighty-three transfusions at the Peter Bent Brigham Hospital that 60 per cent. gave temperature rise of 2·5 degrees, and 47 per cent. had chills. In the series here reported there was some reaction in 46 per cent., temperature rise of two degrees in 27 per cent. and chills in 34 per cent.

Stokes claims that the reaction is due to some substance absorbed from the rubber tubing and is to be avoided by soaking this in normal sodium hydrate solution. This was tried in the last two transfusions with no reaction. As to the results not much can be said as the series is so small. The immediate results were in every case good. There was improvement in appetite and general feeling of well being. The end results would appear to differ in no respects from those found by other workers.

Two were cases of prolonged uterine hæmorrhage. In both the results were good. One came to the hospital almost exanguinated, breathless, sleepless, restless, and perspiring, with red cells less than 1,500,000. Of the various donors volunteering, the husband and three eldest sons proved incompatible. The youngest son proved suitable and was used at weekly intervals for five injections 200 to 450 at a time, with no apparent ill effects on his part and steady improvement on the part of the mother. Operation was then thought safe and a sub-total hysterectomy was done with the removal of a fibroid. The patient was discharged cured.

Two were cases of inoperable carcinoma of the stomach with marked cachexia. Each was given at weekly intervals five transfusions of approximately 500 c.c. each. In both the blood count improved to nearly a normal figure, and there was temporary improvement in general well being, but both finally succumbed to the advancing disease.

One was a case of pernicious anæmia in the practice of a confrère. There was no marked improvement in the blood count, and reactions were more marked and frequent than in other cases. Five transfusions were given. His general health improved, and for a time he returned to work. He died eight months later.

One was a case of puerperal sepsis seen in consultation. There was extreme anæmia, red cell count 1,400,000, white cell count 33,000, with streptococci readily obtained in blood culture. Four transfusions of 450 c.c. each were given at three and four day intervals, with anti-streptococcus serum intravenously. There was improvement in appetite and the blood count improved to red cells 2,250,000, white cells 4,400, but the temperature continued steadily to rise, and she finaliy developed symptoms of thrombi in extremities and brain and died in coma with a temperature of 107 degrees.

One is a case of pernicious anæmia who is still under treatment.

Others were cases of simple anæmia who did well.

SUMMARY

A simplified method of blood transfusion by the citrate method which avoids some of the objections to the original Lewisohn technique is described and experience with thirty-five transfusions detailed. The conclusion of Stokes as to cause of reaction after transfusion appears to be confirmed.

On Selection of Medical Reading.—From the weary phrase of Ecclesiastes, "Of making many books there is no end," to Bacon's sage counsel that "reading maketh a full man," authorities have varied as to how much and what the student, the business man, the physician or the ordinary citizen should read. Quiller-Couch argues that it is starkly impossible to keep pace with all of the books that are being written. "About what is impossible," he says, "one does not argue. We must select. Selection implies skilful practice; skilful practice is only another term for Art." The fundamental basis of this art is a knowledge of the factors to be utilized in determining whether or not to buy a certain book. First, who is the author? What is his character, and scientific standing? What are the sources of his scientific and clinical data? Is he well known as an authority on the subject he discusses? Does he enjoy a reputation for painstaking methods? A knowledge of the personality and qualifications of the author is especially necessary properly to evaluate a scientific book. Second, as to the book itself: Is it merely a compilation prepared by an assistant and stamped with the author's name, or is it a reflection of the author's own work, his personality and opinion? Third, Are the data obtained from recognized hospitals, clinics and research institutions or from the author's private experience? Is the evidence acceptable evidence? Fourth, What of the style? Does the author write carelessly? Are his sentences grammatical? Is the arrangement logical? Is his discussion diffuse, or has he concentrated the material to a minimum? Finally, it has been well said that the style of writing is an echo of the man's own soul. A blatant, didactic style is the mark of the egoist; a simple, reserved style, the sign of a conservative thinker; a careless, rambling style, evidence of a slipshod worker. And these comments will apply to manuscripts as well as to books.—*Editorial, Journal American Medical Association.*

NOTES ON FOOTWEAR

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ONE hesitates to say anything about feet or footwear, because it is such an old subject and everything that could be said has been said many, many times. Another reason for hesitancy is that anything on this subject might tend to deepen the misapprehension which is, apparently, ineradicably fixed in the mind of the general practitioner, viz., that the word orthopædics is derived from the Latin root for our word "foot," rather than from the Greek root for "child". (Just recently a patient was referred by a medical man for orthopædic treatment, and he was suffering from sweaty feet!) However, there is a large proportion of orthopædics in feet. For example, in one of the army orthopædic hospitals, something like eleven per cent. of the cases in 1917 and 1918 were painful feet: metatarsalgias and clawfoot.

Under metatarsalgias we should group bunions and acquired hammer-toe, for they have a common ætological factor: a boot that is too short. There are other contributory causes, for we frequently find clawfoot in infantile paralysis and in injuries involving the internal popliteal nerve in any part of its course. At the same time the faulty boot is, even in these cases, often a contributory cause of the difficulty. We are provided with muscles which will preserve the transverse arch and maintain the foot in its natural shape, just as we are provided with muscles in the leg which will retain the longitudinal arch. When we put boots on, we splint the feet and throw the intrinsic muscles, to a certain extent at least, out of function. There is a resultant atrophy of these muscles, and a falling of the transverse arch. Not only do we get deformity from the atrophy of disuse, but the sole of the boot is usually of the rocker type which exaggerates the malposition. When we get the typical picture of toes curled up, extensor tendons contracted and very prominent, with what practically amounts to dislocation of the proximal phalanges on the metatarsal bones, the main factor in bringing this about is the shortness of the boot. It is obvious that this is the fault, for the deformity of the foot is of the sort which shows the cramped position resulting from the member being pushed into too small a space. Short socks or stockings are also, perhaps, at fault, but the rôle they play is relatively a minor one.

In the ordinary walks of life, man can punish his feet in this way with apparent impunity, but when for any reason he has to carry excessive weight, the disability becomes evident. In civil practice the majority of metatarsalgias, uncomplicated by nerve lesions, come to us in middle life. However, the incidence of this condition due to the weight of equipment carried by soldiers in the late war emphasizes the fact that this crippling is begun relatively early. And when patients come to us seeking relief from the pain of a Morton's disease, metatarsalgia, clawfoot or bunion, we find this one fundamental fault, with variations: the enforced shortening of the foot.

Nature has made a wonderful instrument for carrying weight, with pads to protect the bones and joints. In the feet under discussion the pads which should protect the phalangeo-metatarsal joints are thinned because of the effort of the foot to accommodate itself to the restricted space. The proximal phalanges are hyper-extended and, because of that, the heads of the metatarsals are forced downward, displacing the protective pad. Then the pads below the ends of the toes are thrown out of position by the hyperflexion and immobility of the inter-phalangeal joints. The weight frequently falls on the end and nail of the toe, in place of on the bottom, or on the side of the toe, particularly in the case of the fifth. Compensating attempts to offset this are found in the form of callosities and corns at the points of greatest stress.

That bunion is a variation of the same condition is readily demonstrated. The toe cannot take its proper position, in alignment with the metatarsal bone with which it belongs and, in the attempt to accommodate itself to the confined space, the foot spreads at the widest and weakest part of the ready-made shoe. This results in a lateral luxation of the phalangeo-metatarsal joints, the first being most frequently affected because it is under the greatest stress. Clawfoot may exist without bunion but, when bunion is present, this fundamental fault of cramped foot is present also. While bunion is usually found at the first phalangeo-metatarsal joint, the same pathology may obtain at the fifth phalangeo-metatarsal, or at the metatarso-cuboid joint. It is also found at the metatarso-cuneiform articulation, and here it is usually an upward displacement.

Hammer-toe generally occurs in the second digit. When we remember that the second toe is the longest, we can easily see the part the short boot plays in this deformity. Of course there are cases where the deformity may be congenital, (certainly many patients say they have had it since birth, and that it existed in the previous generation), but when the condition is present in adults, the boot is commonly too short and other stigmata of cramped foot are evident. I do not recall having seen it in an infant.

Considering the pathological anatomy, we find that there is, in addition to the atrophy of the muscles above noted, a distinct thinning of the plantor fascia and fat over the heads of the metatarsals. There is a contracture of the extensor muscles and tendons so that the latter stand out like bow-strings and, concommitant with that, a contracture of the dorsal-capsular ligaments of the phalangeo-metatarsal joints. In the sole, the curling of the toes results similarly in a contracture of the flexor tendons and the plantar part of the capsular ligaments of the inter-phalangeal joints. There is also a relaxation of the transverse metatarsal ligaments. Contracture of the plantar fascia follows. This pathology is common to troubles in the anterior part of the foot. If there is a bunion there is, in addition, the bursitis, and, depending on the severity of the condition, more or less of an exostosis at the particular joint involved. Arthritis may be present by extension from the bursitis.

Pain which patients suffer from this disability varies considerably. In Morton's disease, it is considered due to the pinching of the nerve between the head of the fifth and the shaft of the fourth metatarsal bone. This causes a fire-like stab of pain on lifting the foot. More likely there is a steady ache in the ball of the foot. Not infrequently the patient complains of discomfort in the front of the leg, and that he is easily tired walking. Examination shows that he is walking on his heels and has the extensors in the anterior part of the leg on a continuous strain to take the weight off the front part of the foot. This automatic attempt to relieve the distress often leads to aching in the muscles of the back because of faulty balance in maintaining the upright position. Frequently the patient complains of pain in the feet and legs and of weakness and inability to walk comfortably; but whether it be any of these, or the burning of a bunion, it is very important to include the feet in making an examination of any patient. Every doctor should provide himself with a foot measure, should know what a shoe size is, and should be able to determine whether or not his patient is wearing the proper size.

In obtaining relief from this condition, the first thing one thinks of is to have shoes made which will allow for correction of the deformity. When orthopædic shoes are mentioned, one immediately thinks of the large, wide-toed variety. To secure an anatomical cure the wide toe is essential. In the great majority of cases, however, all that is needed is to get a boot of the proper length. Most people wear badly-shaped boots, but the majority do not suffer from metatarsalgia. There is one thing to be considered in the ready-made boot, however, and that is that, frequently, if the boot is long enough to give the foot proper room, it is too wide at the heel seat or about the waist of the foot. Consequently, a boot made to order is often indispensable. The made-to-order boot need not be conspicuous. This is a point which we must take into consideration, because many people would rather suffer the pain of the deformity than dress the foot in an ungainly shoe.

There are three things which are essential in a boot or shoe. The first is that the boot be long enough. Shoemakers who are interested in keeping their customers rather than in making individual sales, measure the foot carefully and give the customer a shoe three sizes longer than the foot measures. The shoe size varies somewhat, but the majority are from one-third to three-eighths of an inch; and master shoemakers have long known that the foot covering must be an inch or an inch and an eighth longer than the foot if the wearer is to walk comfortably. The reason for this allowance is that the foot spreads antero-posteriorly from one to two sizes when the full weight is taken. The poorer the tone of the muscle, the greater will be the antero-posterior spread. (The fact that many of these conditions arise in the flabby foot of the sedentary person of middle life, and that it occurs frequently in the case of soldiers after long marches, shows that the loss of tone may be due either to disuse, or to excessive use. It also shows that one may do ordinary work in a boot that is too short, with comparative impunity.) The need of the third shoe size may be illustrated to the patient by showing that, when the foot and the sole are in contact, they form two curved surfaces at the end of each step. The outer of two curves so placed must be slightly longer than the inner if the inner is not to be distorted. It is also necessary to allow for variation in the thickness of stockings. The second essential is that the sole of the boot be flat from the toe to the shank, and that the heel be of moderate height. With wear, the sole tends to turn up at the toe and, if it is of the rocker type at the start, it becomes a progressively pernicious splint. In the matter of the heel, one must not be too insistent in running counter to the dictates of fashion. For an anatomical cure, the lower the heel the better, but for practical purposes, one can get on very well with a heel about an inch and a half high. However, as is well-known, the height of the heel is to be governed by the angle of voluntary extension of the ankle. The last essential is that the boot shall fit snugly about the heel and waist of the foot. To obtain this, as has already been observed, it will be necessary to have boots made for many cases.

If it is necessary to have a boot to made order, the surgeon must see to it that the boot is made according to his specifications. Shoemakers are almost certain to make a boot to fit the deformity. This may feel comfortable temporarily, but it does not permit of the cure desired and only tends to aggravate the condition later. It is in these cases which must have special boots that particular stress must be laid on having the boots tight at the heel and waist. A snug-fitting boot at the waist immediately corrects part of the excessive spread in the phalangeo-metatarsal joints.

Many forms of splinting have been advocated for the correction of this trouble, from a bar across the sole to a plate made over a corrected plaster model. All have their fields of usefulness and their limitations. In the more severe types, a stiff leather splint, properly shaped, with a lift just behind the metatarsal heads, and fitted with loops by which the toes can be tied down, is of advantage. This corrects the faulty transverse arch and allows for continuous stretching of the extensor and flexor tendons. By wearing this about the house at night and in bed, the patient can get on and be about his business through the day with a more simple splint. The most satisfactory thing is a pad of saddler's felt, half an inch thick, trimmed to correct the most faulty part of the transverse arch, and sloping from that in all directions. Hold this in place by a wide band of strong elastic. The more carefully the pad is fitted, the greater the success. In the majority of cases, it is the only thing that is needed in the way of a splint.

But splinting alone will not effect a cure. The intrinsic muscles of the feet must be developed to the point of sustaining the transverse arch in a painless position. These muscles are best trained by teaching the patient to regain the prehensile power of the foot.

This cannot be done without the assistance of a masseur. The foot must be rendered supple by heat and massage and then the training of individual muscles should be begun. That means, of course, that the masseur must be properly trained. He must krow anatomy thoroughly—not only the origin and insertion of the muscles, but particularly the action of the individual muscle and its synergistic group. This is a matter which cannot be taught in a short course. The best-trained masseurs are those possessing certificates from The Incorporated Society of Trained Masseurs, England; but even with these, the work of the masseur must be supervised just as carefully and intelligently as the work of a nurse is watched in a case of typhoid. There is a lamentable ignorance on the part of the profession in general, as to the scope of massage and muscle-training.

The exercises which have proved most effective are those which begin with flexing the phalangeo-metatarsal joints. This can be done over a bar of wood curved to fit the transverse arch, and fixed so as to give resistance. Ladder-climbing in very soft-soled shoes, or barefooted, provided the toes are turned well in so that the rungs come behind the ball of the foot, is also very efficacious. Picking up articles with the toes should be attempted. Small objects like marbles are not of much advantage because they are picked up by the action of the flexors alone. Larger objects, like golf balls, demand the use of the lumbricales and interosseii. One should try even as large an object as a tennis ball in order to develop the transverse head of the adductor hallucis.

It is not necessary to carry this training to the point of performing freak tricks with the foot. If one secures sufficient tone in the muscles to relieve the pain permanently, that is enough. The length of time required to do this varies with the individual. A few patients will get on very well with half a dozen lessons. Others need continual supervision over a period of weeks or months, but if there is a properly trained masseur to follow the corrective splinting by muscle training, there is no case of metatarsalgia which cannot be cured without operation excepting, of course, such cases as are due to nerve involvement. Tenotomy may perhaps expedite the cure, but it is not essential. The same statement holds good for hallux valgus. The only value of an operation in the latter condition is a removal of the bony deformity. There are, of course, cases wherein the element of time is an important factor and operative interference is advisable. In these cases, however, only the minimum of operative interference is justified.

In conclusion, I would urge the attention of the profession to proper footwear. Let me repeat that every doctor should know what a shoe size is, and why the proper size should be worn. Bad shoeing usually begins in adolescence and little can be done to educate the general public, but the ignorance which exists on the part of the profession as to the crippling effect of short boots, is little short of criminal. If the evil is generally recognized, a great deal can be done in the way of prevention by the doctors in the schools. Every doctor in that work should provide himself with a shoe measure, and should know its use. Shoe factories have various methods of marking, and sometimes the size varies widely from that quoted as ordinarily accepted. Confusion results. However, if measurement is made above the heel, allowing one shoe size for the thickness of the counter at the heel and the toe cap, the correct size of any shoe may be obtained. Where exceptional sizes are in use, instruct the patient to get a shoe an inch and an eighth longer than the foot. The more the pointed toe appeals to the person concerned, the longer the boot must be.

It is a pleasure to note that this subject, which has been discussed ever since shoes displaced sandals, has been written on this past winter by men widely separated geographically, but at one in intelligent treatment. Since my notes appeared in *The Lancet*,[1] Drs. Mennell, Whitman,[2] Cross[3] and Roux[4] have shown an appreciation of the possibility of obtaining relief in these conditions by training the muscles controlling the part.

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SURGICAL CLINIC OF DR. F. N. G. STARR

TORONTO GENERAL HOSPITAL

REPORT OF TWO CASES OF ACUTE PANCREATITIS

STAFF:—*Chief*—DR. F. N. G. STARR
Assistants—DR. E. STANLEY RYERSON
DR. ROSCOE R. GRAHAM
DR. JAMES A. ROBERTS
DR. GEORGE E. WILSON
Resident House Surgeon—DR. R. V. B. SHIER
Junior DR. A. Y. MCNAIR

CASE No. 1—*Acute Suppurative Pancreatitis, associated with Cholelithiasis.* Miss E. B. W., age forty. Referred by Drs. Bryans and Goldie. Admitted to Toronto General Hospital November 16th, 1920.

Patient had to be taken to hospital on a stretcher, and complained of pain in the epigastrium, sick stomach, and loss of appetite.

Date and Mode of Onset. Two years ago this patient suffered from her first attack of acute pain in the upper mid-abdomen, which did not radiate in any particular direction, did not confine her to bed, and lasted only a few days. She has had since that time recurring attacks of pain in the right epigastrium, radiating around the lower ribs to the back. These attacks are varied in duration, and some of them extreme in character. Such an attack started on October 15th, beginning with severe pain and vomiting; the vomitus having the appearance of coffee grounds. This attack has not subsided as the former one. From notes received from Dr. Goldie, it is stated that this pain persisted, with sharp exacerbation and a rise of temperature varying from 99·2° to 102·5°. This kept up for a period of two weeks. There was an absolute distaste for food, and an inability to retain much of what was taken. At the end of the second week there was rigidity of the upper right rectus, with marked local tenderness under the right costal margin, at the edge of the rectus muscle. The rest of the abdominal wall gave no evidence of rigidity on palpation, nor were any other tender points made out. The week previous to her admission to hospital there had been practically no rise of temperature. The pain had subsided to a great extent, as far as the right upper abdomen was concerned, but in the left upper abdomen the patient complained of an indefinite pain. There has been no history of jaundice at any time.

Condition on Admission. Patient looked extremely ill, and showed the evidence of her previous suffering. There was almost complete abscence of muscular rigidity in the right upper abdomen, but in the left upper abdomen, just above the umbilicus, there was an indefinite sense of resistance, which was not due to muscular rigidity, and this area was extremely tender on pressure. This area was slightly resonant on percussion. Temperature was 99° and the pulse rate 80 per minute.

Laboratory Reports. Urinalysis showed nothing abnormal. White blood count, 8,500. Red blood count, 5,000,000. *X*-ray examination of the gastro-intestinal tract by Dr. Dickson reported adhesions around the gall bladder, fixing the second portion of the duodenum; also in the left upper abdomen there was a constant shadow, which encroached upon the stomach and the transverse colon, which could not be explained.

Diagnosis. In view of the fact of her pain and tenderness in the right upper abdomen, it seemed obvious that this patient was suffering from a gall bladder lesion. Because the nausea was out of all proportion to the other symptoms, the diagnosis of pancreatic involvement was suggested by Dr. Goldie early in the attack, and when seen on admission to hospital, the indefinite fulness to the left and above the umbilicus, together with the tenderness in this area, confirmed our suspicion of pancreatic involvement.

Operation. Dr. F. N. G. Starr operating. Near mid-line upper abdomen incision exposed a tumour mass, which was evidently an enlarged pancreas. The gall bladder was a pale, muddy color, markedly free from adhesions, but thick-walled, and quite enlarged, and contained a number of stones. The enlarged gall bladder encroaching upon and deforming the duodenal cap, explains the *x*-ray finding. On investigating the tail of the pancreas, from which the tumour mass was apparently arising, one's finger slipped into an abscess cavity, the result of a suppurative pancreatitis. The great omentum showed numerous areas of fat necrosis. The appendix and cæcum were not disturbed for fear of dissemination of the infection. A swab was taken for culture. The gall bladder was opened, and a small amount of clear mucoid material was evacuated, containing flakes of fibrin and many stones. A tube was sewn into the opening in the gall bladder, by means of two purse-string sutures of iodine catgut. The general peritoneal cavity was walled off from the gall bladder region by means of a coffer-dam of gauze. The tube and gauze emerging from the peritoneal cavity through a stab wound under the right costal margin. A stab wound was also made in the left loin, and a tube situated in the abscess cavity emerged through this opening. The opening in the abscess cavity was again separated from the peritoneal cavity by strip-gauze packing, which was brought out through the abdominal incision. The abdomen was closed in layers.

Progress. The patient on returning to bed suffered a considerable amount of shock. Forty ounces of saline were given interstitially; a Murphy drip of ten per cent. glucose; ten per cent. soda bicarbonate; concentrated tincture digitalis—two drachms to a volume of ten ounces. When this amount had been given, the Murphy drip was discontinued for four hours, and again started with the above content, excepting the digitalis. The gauze around the gall bladder was loosened on the second day, and removed on the third day. The gauze around the pancreatic drain was removed on the fourth day. The pancreatic drain, from which a small amount of sero-purulent fluid had been discharging, was completely removed on the fifth day, after which there was practically no discharge. The temperature for the first three days ranged from 100° in the morning to 102° in the evening, after which time it became normal, and has remained so. The convalescence otherwise has been uneventful, the gall bladder drainage being removed on the fourteenth day, there still being a slight discharge of bile. The one troublesome factor has been the fact that this patient found it almost impossible to sleep during the night, but is able to secure four or five hours' sleep during the day. She was out of bed for the first time on the sixteenth day, and 6-12-20 her condition is so satisfactory that she is to be discharged from hospital.

Laboratory Report. Analysis of urine shows nothing abnormal. Culture of swab taken at time of operation was sterile.

CASE No. 2. *Acute Hæmorrhagic Pancreatitis, Associated with Cholelithiasis.* Mr. F. S., age fifty, married, presented himself at the Outpatient department 5-2-20, complaining of attacks of pain in the epigastrium, coming on at intervals.

General Appearance. Pale, ill-nourished; has an anxious expression.

History of the Present Condition. Patient was well until April, 1919, when half an hour after eating his breakfast, he was suddenly seized with a very severe pain in the left upper abdomen, which was not localized in any particular area. It did not radiate to any other part of the body; was not relieved by change of posture, nor by lying still. It required two hypodermic injections of one-quarter grain of morphia each. At the end of twenty-four hours his pain had entirely gone, but he felt so wretched, as the result of the ordeal, that he was off work for two weeks. In October, 1919, he had an attack of the same character, which again necessitated his stopping work for two weeks. Since that time he has often complained of a lump-like feeling in the œsophagus and epigastrium immediately after eating his meals. These attacks lasted for half an hour, and were relieved by "dyspeptic tablets". Towards the end of November he again had a very similar atack, and the discomfort after taking food has markedly increased. He suffers from what he calls a "heavy feeling in his stomach", and since Christmas has been very listless and lacking in energy, being unable to accomplish much work in a day. On the fourth of January, 1920, he again had an attack, which was more severe than any one previous, and has felt so miserable since that he has been unable to work.

Family History and Past Illnesses. Have no bearing on the present condition.

General Examination. He is very thin, pale, and looks distressed. Weight, 130 pounds. He has a very poor appetite, and often passes undigested food. He has immediate epigastric distress on taking food, which lasts for one-half to one hour, sometimes associated with nausea, and rarely with vomiting. Bowels move daily without a cathartic. There is no history of having passed blood or mucous. He has very little headache. Examination of the respiratory system shows nothing abnormal. There is a remarkable freedom from arterio-sclerosis. Blood pressure, systolic 120; diastolic 100. Genito-urinary system shows nothing abnormal. Denies venereal disease. Nose, throat and ears show nothing abnormal. Teeth have all been extracted, and he wears plates. No Romberg sign present. Eyes react to light and accommodation. Superficial reflexes present and normal.

Abdominal Examination. Abdomen scaphoid; no bulging or muscular rigidity; no tenderness on palpation; no mass palpable. Neither kidneys nor spleen are palpable. Liver is not enlarged. There is no free intra-peritoneal fluid. Advised to enter hospital.

Admitted to hospital 5-2-20, directly from out-patient department.

Laboratory Examination. Urinalysis shows nothing abnormal. White blood count, 6,800; red blood count, 4,400,000. Blood Wasserman, negative. *X*-ray examination of the gastro-intestinal tract, after ingestion of a barium meal, shows nothing abnormal.

10-2-20. Without any apparent reason, this patient suddenly developed an attack of acute abdominal pain, associated with cyanosis, an extreme degree of shock, and very rapid and feeble pulse. He became exceptionally restless, writhed in bed, and complained of a diffuse pain in the upper abdomen. There was no muscular rigidity; no localized tenderness, and no abdominal distention. He vomited once or twice as the result of the pain. After half an hour hypodermic injections totalling half a grain of morphia had no effect whatever on the pain, and a light ether anæsthesia was given over a period of half an hour. The acute pain persisted for about two hours in all, gradually lessening at the end of the first hour, and in the evening the patient was reasonably comfortable, and slept well that night. Urinalysis following the acute attack showed a slight trace of albumen, and a few hyaline casts. The next morning, however, he seemed to be still suffering from a degree of pain in the upper abdomen, and it was considered advisable to undertake surgical relief.

Diagnosis. In view of the history of this man's gastric disturbance, and the history of his attacks of pain which ended suddenly, but left him exhausted, a diagnosis of cholecystitis and colelithiasis was made. In addition to this, the severe degree of shock and pain associated with the acute attack which he developed in hospital, together with the diffuse tenderness and pain in the upper abdomen, which was not relieved or made worse by lying still or by changing posture, the diagnosis of acute pancreatitis was added to the above.

Operation 11-2-20. Dr. Roscoe R. Graham operating. Gall bladder incision was made, with an extension upwards towards the ensiform cartilage. On opening the peritoneal cavity, a fair amount of blood-stained fluid escaped. Small bowel presented, which was reddened and distended, showing much more evidence of an acute lesion than the large bowel, which was collapsed beyond the splenic flexure. On the great omentum were many areas of fat necrosis. The gall bladder was thick-walled, and contained stones. There were no adhesions about the gall bladder. Could feel no calculi in the common bile duct, but there was a very marked hæmorrhagic exudate around this structure. The pancreas was quite three times the normal size, with much hæmorrhage in it, and was very tense and firm on palpation. Removed the gall bladder and stones, and drained the common duct. An opening was made through the anterior layer of the lesser peritoneal sac, above the stomach. The pancreas was then bored into by the finger. There was a fair amount of bleeding following this procedure, but it was easily controlled by strip-gauze packing. A tube was put down to drain this area. At this stage the patient was in very poor condition, and the abdomen was rapidly closed.

13-2-20. Following the operation, the patient's pulse became alarmingly rapid, and very feeble. Forty ounces of six per cent. gum acacia were put into his vein, and interstitial salines were given, but despite our best efforts, the patient succumbed on the evening of this date.

Autopsy Report. Pancreas: Weight, 370 grams. Measures 18 cms. long by 6 cms. wide by 3 cms. deep. Pancrease was fairly firm in consistency. The peri-pancreatic tissue was filled with hæmorrhagic exudate. In the head and tail of the gland were found two small areas of what appeared to be very congested, but otherwise normal, pancreatic tissue. The remainder of the pancreas was mottled, and reddish brown in colour, with very dark areas scattered throughout. Near the head of the pancreas there was a fairly large area, which was softer than the rest of the gland, and is apparently undergoing necrosis. The duodenum throughout its whole length was dilated to three or four times its normal size, and the mucous membrane showed three or four whitish plaques about twice the size of a pin-head. The remainder of the gastro-intestinal tract was apparently normal. The common bile duct and hepatic ducts were opened in situ, and were apparently normal. The duct of Wirsung leading to the pancreas could not be identified. Pleural cavities: Near the vertebral extremities of the ribs, there were a number of yellowish white chalky-looking areas about the size of a grain of wheat, slightly elevated above the surface. These appeared to be areas of fat necrosis. Through out the omentum and surrounding tissues, there were many areas of fat necrosis varying in size from that of a pin-head to a grain of wheat. Histological examination of the pancreas showed large areas which were degenerated, with much hæmorrhage in them. In sections from many areas one found but few islands of Langerhans which were not markedly degenerated and filled with hæmorrhage.

Comment. In the pre-operative history of both these cases, there is a striking similarity. It is of great interest, and indeed difficult to explain, why one should end in the suppurative, and the other in the hæmorrhagic type of pancreatitis. Ever since Opie reported his classical case of ball-valve action, due to biliary calculus in the ampulla of vater, which intermittently occluded the biliary outflow of the duodenum, and forced bile into the pancreas, causing acute hæmorrhagic pancreatitis, there have been many theories advanced to explain the relationship between pancreatitis and biliary lesions.

Opie contended that if a stone lodges in the ampulla of vater and occludes both the pancreatic and bile duct, chronic pancreatitis takes place; but if it is small, and blocks the ampulla below the level of the pancreatic duct, then acute pancreatitis will follow.

The fact, however, remains that in this as well as other clinics, there are encountered many instances of chronic pancreatitis in which no calculi can be demonstrated in the common duct. In the acute hæmorrhagic case here reported, it will be noted that the common duct and ampulla were apparently normal. Hence, if we are to explain pancreatic disease of this type by the regurgitation of bile into the pancreas, which from experimental data appears to be the correct view, then we have to seek further than the obstructive mechanism of stone in the duct.

Two other factors must be taken into consideration in this connection. Firstly: Practically all cases of pancreatitis, whether acute or chronic, are associated with biliary disease, with or without the formation of calculi. May not the reaction to infection, or trauma from passing stones, have caused a stenosis of the opening from the ampulla into the duodenum, thus preventing free exit of the bile, with some degree of flow into the pancreas at all times? Secondly: Archibald, of Montreal, demonstrating that the sphincter of oddi does exist at the opening of the ampulla into the duodenum has proven that it is very real. He has demonstrated experimentally that it will withstand a real pressure within the bile duct, before it will allow the contents to flow into the duodenum. There is also every reason to believe that this sphincter is controlled by the autonomic nervous system, as are the pyloric and ileo-cæcal sphincters. We know that in digestive disturbances such as these patients complained of, there is spasm of the pylorus and ileo-cæcal sphincter, and there is no reason to doubt that spasm occurs at the same time in the sphincter of oddi. This fact could easily explain the regurgitation of bile into the pancreas, because of a persistence of spasm in this area, which was initiated by the biliary lesion.

The explanation of the suppuration in the first case is very interesting, particularly in view of the fact that culture of the contents of the abscess cavity proved to be sterile. Is it not highly probable that the suppurative area was formerly a part of an acute hæmorrhagic pancreatitis the remainder of the gland being involved to a degree which still permitted of practically a complete return to normal. A convincing factor will be if this patient, in the course of the next few years, should develop diabetes. At the present time, however, it is worthy of note that the urine shows nothing abnormal.

Again, in view of the fact that the contents of the abscess proved to be sterile on culture, it is difficult to explain the temperature. We know that all pancreatic disease is as a rule afebrile. The period of greatest pyrexia in this case was associated with pain and muscular rigidity in the right upper abdomen, and was prior to any tenderness or palpable mass to the left of the middle line. Thus one would draw the conclusion that the suppurative focus in the pancreas had nothing to do with the elevation of temperature, which was caused by the infection in the gall bladder and bile ducts. If this is the correct analysis, then it is interesting to note a pancreatitis of four weeks' duration ending in suppuration at this late date, and followed by recovery after operation. This is the latest date of operation coincident with recovery, according to Korte, who operated upon seven cases during the fourth week, with three recoveries and four deaths, and in the fifth week operated upon four cases, all having a fatal issue. In acute hæmorrhagic case, the question no doubt will arise: "Why was operation not done in the day of the acute attack, which developed while the patient was in hospital; particularly in view of the fact that acute pancreatitis was diagnosed as a part of his lesion?" This can immediately be replied to by asking, "When is the most favourable time for operation in acute pancreatistis?" In this connection it is interesting to note that Korte, in his very thorough and scientific paper on this subject in 1894, advised against operation during the acute stage, and that later, in 1910, in a paper published in the *Annals of Surgery*, he was obliged to reverse his decision, and advocated early operation. In the case in question, however, a formidable operation during his acute attack appeared to offer no hope of a successful issue, because of the extreme degree of shock from which the patient was suffering. Later in the day, when the pain subsided, the patient volunteered the information that this was of a similar character to his former attacks, only more severe. It was then logical to suppose that, in the light of his past history, he would recover sufficiently to offer a possibility of a successful issue as the result of operative interference. As far as one could tell from his clinical condition the next day, this hope seemed to be justified. The fact remains, however, that there was a fatal issue. The question one has to answer is, "Why did the man die?" In this connection, two factors must be taken into consideration. First, shock of operation; second, destruction of pancreatic tissue. We have all seen recovery from very severe intra-peritoneal lesions, which required even more formidable operative procedure than were undertaken in this instance. In the light of the experimental work of Coffey, one strongly suspects that the destruction of pancreatic tissue was probably the deciding factor. He has proven the absolute necessity of the islands of Langerhans, which appear to furnish the internal secretion ascribed to the pancreas. In dogs he has been able to divert the whole of the other pancreatic secretion from the gastro-intestinal tract, and has found that after a few days the dogs were able to carry on a normal metabolism. In other words, just as the pancreas is able to take on a compensatory work for the other digestive juices, so the other digestive glands can respond in the same way in the absence of pancreatic juice. However, in other dogs he has proven that if the islands of Langerhans are destroyed, death is inevitable, because their secretion appears to be absolutely essential to the proper corelation of the secretions of the other endocrine glands, such as the thyroid, pituitary body, the adrenals and the testicles or ovaries. In this case histological examination showed that there were very few islands of Langerhans which escaped destruction, and they would probably be incapable of producing sufficient internal secretion to carry on life, and thus we can explain our fatality apart from the operative shock.

As to the reasons for drainage of the pancreatic area, and boring into the body of the pancreas with the finger, we know that as long as one provides free exit for pancreatic juice, that its presence in the peritoneal cavity is no more dangerous than bile. For this reason one must aid direct drainage of the area to prevent further fat necrosis and destruction of the gland, because attacking the gland with the finger in this manner will not destroy normal pancreatic tissue, but will provide a means of exit for any locked-up extra peritoneal pancreatic juice, which when confined rapidly produces very great destruction.

The conclusions which one would draw from these cases would be the fact that pancreatic disease and biliary disease are very closely allied; that the biliary disease precedes and is responsible for the pancreatic lesion. It is well recognized that the vast majority of acute lesions of the pancreas are either incorrectly diagnosed, or else are not diagnosed until the unfortunate individual reaches the post-mortem room. Thus we feel that in upper abdominal pain, which comes on suddenly, associated with an extreme degree of shock, and a peculiar cyanosis, one can be put on their guard, and at least suspect pancreatic involvement, if the previous gastro-intestinal history is of the type which we have learned to associate with chronic gall bladder disease. In view of the fact that the hæmorrhagic case gave a history of attack similar to the final one, it is not inconceivable that there are many instances of acute hæmorrhagic pancreatitis which remain undiagnosed, and which recover without operative interference. The comforting factor in this hypothesis is that one probably is justified in refraining from operative interference in the acute attack while the patient is still suffering such a severe degree of shock as the result of the pain. There is also comfort in the fact that in some of the fatal operative cases at least, the result can be attributed to the terrific destruction of the islands of Langerhans, quite apart from the operative procedure employed. It will be noted that in the pre-operative history of both these cases, and particularly in the hæmorrhagic pancreatitis, that these patients complained of pain in the left upper abdomen just above and to the left of the umbilicus over a long period of time. One finds that this pain is complained of, and also that this area is painful on palpation when investigating patients who are the subject of chronic gall bladder disease. May not this clinical finding be of sufficient importance to urge a more rapid recourse to surgery in such instances, and avoid the possibility of a disastrous pancreatic lesion developing?

CONTINUOUS FEVER IN CHILDREN WITH STREPTOCOCCIC INFECTION IN THE BLOOD STREAM, WITH RECOVERY

CASE REPORTS

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THE hæmolytic streptococcus as a secondary invader has been much discussed since the pandemic of so-called Flu. Its significance in relation to many atypical clinical conditions during and following influenza is now generally appreciated. A great fund of facts in relation to it has been accumulated by the intensive study given it especially as it occurred in army cantonments. There still exists much confusion about many details in relation to the streptococcus in general, as for example the classification of streptococci. This general study has brought out, however, many important features not encountered or little appreciated before this pandemic, which are now generally recognized. An interesting complication is that encountered in this paper.

That a child, soon after influenza, can run a low grade temperature for four to six months with so general an infection as to give a positive blood culture for hæmolytic streptococcus and recover with apparently little or no permanent physical disability, or recover at all, is to me, an interesting clinical fact. It is an experience I believe I have never encountered previous to these last two years. Apparently it has occurred frequently in cantonments of soldiers. The meagre references encountered in the literature to similar cases in children, in an attempt to satisfy my anxiety as to the outcome of these particular children, prompted me to an extensive reading of the literature on hæmolytic streptococci extending now over many months; and to write this paper with the idea that it might be of service to others who might also be going through such a trying experience.

What are some of the important considerations of the hæmolytic streptococcus from our point of view as clinicians? These might be summed up as follows:

(*a*) Has the hæmolytic streptococcus a normal habitat in the tonsils?

(*b*) Under what conditions may it be pathogenic? (1) Increased invasive characteristics. (2) Its physical and chemical change, *i.e.*, mutation.

(*c*) What are the routes by which a general invasion occurs? (1) Blood. (2) Lymphatics, ascending or descending.

(*d*) What decreases its activity? (1) Sunshine. (2) Fresh air. (3) Food. (4) Vaccine. (5) Tonsil enucleation.

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The hæmolytic streptococcus as a normal inhabitant of the tonsils, in the sense that the staphylococcus albus is of the skin, cannot be proven in the light of our present knowledge. This organism often does, however, occur in large numbers in pharyngeal mucosa in normal persons, and in persons suffering from acute infectious diseases. Cultures from the surface of the tonsils are positive more frequently and more strongly than from any other area in the nasopharynx and crypt cultures in vivo give a positive in a higher percentage of cases than surface cultures, while crypt cultures of excised tonsils are positive in a still higher percentage, Hæmolytic streptococci have been found in swab cultures in 61 per cent. and in crypts in 97 per cent. of excised tonsils showing chiefly hyperplasia.

The frequent occurrence of positive hæmolytic streptococci cultures obtained from the tonsils and pharynx in apparently normal individuals during the epidemic of measles in the army cantonments in 1917–1918 was a matter of wide spread interest. Groups of apparently normal persons became carriers in 83·2 per cent. (Levy and Alexander[1]), 70 per cent. (Irons and Marine[2]), 83 per cent. (Fox and Hamburger[3]), and 45 per cent. (Knowlton[4]) where six months before, the same groups or similar groups yielded but 15 per cent. The relation of chronic carriers to the development of a streptococcus epidemic is uncertain and must remain so until means are available for showing whether the hæmolytic streptococci harboured by them are identical with these responsible for the epidemic. The theory of contact infection is the only logical one with respect to these epidemics. There is some evidence, however, that the streptococcus isolated from the throat and from empyema exudate are identical biologically.

Under what conditions does the streptococcus hæmolyticus become pathological? Three possible factors may become concerned in the production of secondary streptococcus infections. (1) The existing dormant organism in the tonsil or throat may become enhanced in its virulence through symbiosis or by the primary virus as influenza, measles, scarlet fever, pneumonia, etc. Mutations are believed to occur in humans under certain favourable conditions (Lewis, D. M.[5]). The widest extreme that is classical, is the isolation of a pneumococcus from an endocarditis which settles down to the later laboratory life of a hæmolytic streptococcus. The evidence also points to the fact that all non-hæmolytic strains are methæmolytic producers when grown on suitable media. (2) They may become active through the lowering of resistance of the respiratory passage. (3) They may attain increased invasive powers through the lowering of general resistance of the host. Probably all three factors are combined.

It has been suggested that leukopenia and diminution of phagocytic activity of the leucocytes in influenza may account in some degree for the severity and frequency of secondary infections in this disease. In general the more virulent the organism, the more distinct is the capsule and the less susceptible are the cocci to phagocytosis.

What are the routes by which general invasion occurs? The two routes of invasion are through the lymphatics and blood stream. One is profoundly impressed on reading the literature with the relative infrequency with which the organism is isolated from the blood stream. This in itself points strongly against invasion as a rule directly from the tonsilar tissue into the blood stream, although probably this does occur to some extent. The infection may be ascending or descending, in the former sinusitis, otitis media, and mastoiditis, or descending in the later laryngitis, bronchitis, pneumonia, and the frequently met with empyema. The analogy has been made to the tubercule bacillus which not infrequently passes down through the cervical glands, and through the thoracic duct, and right heart, finally invading the lung through the lesser circulation, and never appearing in the blood stream.

A summary of the literature on the frequency of blood cultures of any organism in influenza and its complications shows such wide variation of opinion as to make a rather chaotic affair and I make no attempt to present it. In not a few instances when numerous blood cultures were obtained, no organism was found. In other instances they varied from almost none (Fleisher and Hamilton[6]), to 50 per cent. (Hirsch and McKinney[7]). These instances may be given as evidences of the wide variations in the frequency of any growth at all, streptococci or other organisms.

The assertion is made (MacCallum[8]) in a monograph on the pathology of the pneumonia in United States Army camps during the winter of 1917–1918 that blood cultures taken from human cases during the course of broncho-pneumonia and empyema are almost always sterile except in the terminal phases of the disease. Whether in many instances organisms do not get into the blood in sufficient quantities to produce a growth, or whether in some instances with repeated blood cultures a positive culture might not more often be found, are interesting problems, but still disputed. That it may occur as a blood stream infection there is no doubt. Why it occurs so infrequently and inconsistently is yet to be demonstrated.

Recoveries when blood cultures were positive for streptococci undoubtedly have occurred in far more instances than are gathered from the literature. Apparently little attention was given to this feature in the study of the army camp. However, recoveries where positive blood cultures were obtained have been recorded in several instances.

What measures may be resorted to, to combat this condition? While it may be possible to eradicate some of the streptococci from the tonsillar crypts with various antiseptic solutions the feeling is general that excision of the tonsils offers the highest percentage of cures in the so-called carriers, although excision of the tonsils does not necessarily mean that the individual is free from hæmolytic streptococci. Fresh air, good food, and sunshine are important factors in combating this organism.

Case Reports: April 1st, 1917, male child, three and a half years old.

Past History. Full term. Normal birth. Birth weight, eight pounds. Breast fed six months. At birth there was a systolic murmur over the base of the heart, no enlargement. This murmur disappeared in two weeks, and on subsequent examinations it was never heard again. Pneumonia at thirteen months. Tonsillitis at two years. Four months later, German measles. At two years ten months, looseness of movements lasting one week, two to three a day with no elevation of temperature. November, 1918, was in the Harriet Lane Hospital for children at the Johns Hopkins Hospital with a temperature of 105° for four days with a head cold and no other clinical signs. His white count was 4,200. The diagnosis of flu was made.

Present Illness. Apparently perfectly well until five weeks ago, when appetite failed and he acted at times as if tired.

Physical Examination. Well developed and well nourished child. Skin and mucous membranes good colour. Pupils equal and react. No nystagmus, no strabismus. Cervical glands showed slight enlargement. Teeth all in good condition. Tonsils considerably enlarged. Chest well formed. Heart: not enlarged, rate 80, systolic murmur rather loud, heard all over precardia; greatest intensity at the apex transmitted to the axilla distinctly, murmurs not altered by holding breath. Lungs: no râles, no alteration in breathing, no dulness. Abdomen: slightly distended, no tenderness, no masses. Spleen not palpable. Liver not palpable. Extremities: reflexes normal, no Kernig.

Treatment. Immediate operation on tonsils was advised. Child ordered to bed.

April 7th. Tonsils removed, the left contained considerable pus. A culture was made and showed a growth of hæmolytic streptococcus.

May 4th. The child had a fair convalescence; temperature remained normal most of the time, with only an occasional rise to 100·5° (rectal). No improvement in appetite.

May 16th. Colour pale. Slight daily rise in temperature, occasionally 100·8° (rectal). Ears normal. Throat slightly injected. Lungs normal. Heart not enlarged, systolic murmur clearly audible. Abdomen soft, no tenderness. *Blood.* White count 13,000. Differential count: mononuclear cells 30, polynuclear cells 70. Radiograph of chest: No peribronchial thickening, no enlarged bronchial glands. *Urine examinayion.* No albumen, no sugar; sediment, a few leucocytes.

May 27th. Feels fine. Full of life. Colour not good. Systolic murmur distinctly audible. Pulse 88. Blood culture positive for hæmolytic streptococcus. Temperature twice daily 100·5° (rectal). White count 8,000. Differential count: polynuclear cells 25, large mononuclear cells 38, small mononuclear cells 25½, transitional cells 6½, eosinophiles cells 4, myelocytes 1.

June 15th. Still in bed, active, full of life. Still runs temperature once a day or once in two days reaching 100·5°; after a nap it drops down to 99·2° or 99·6°. The heart rate is 88 to 90. An autogenous hæmolytic streptococcus vaccine was begun one week ago starting with 3 m. of a dilution of 30,000,000 dead bacteria to one c.c. This gave a slight local reaction. Increased each third day, care being taken not to get more than a slight local reaction.

June 20th. Each second or third day temperature 100·5° to 100·8° at each reading. Looks fine. Murmur almost inaudible. Now getting about 1,000,000,000 dead bacteria twice a week. Eating poorly.

July 5th. Sent to the salt water, allowed to get up and play on the beach. Murmur gone. Temperature 100·2° to 100·5° once in 3 or or four days. Appetite improved.

September 15th. Blood cultures negative for hæmolytic streptococci. Temperature normal. No murmur. Apparently well.

June, 1920. For many months this child has been perfectly well. Murmur has entirely disappeared.

December 25th, 1918, male child age three years.

Family History. Father and mother both well. One brother six years old is well. One sister died ten years ago at eighteen months of age of tuberculous meningitis.

Past History. Full term. Normal birth. Birth weight seven and a half pounds. Breast fed two months, then whole milk modification of certified milk. Progressed perfectly well until present illness. During the height of an epidemic of influenza in November, 1918, the boy was exposed to infection from father who had pneumonia. The boy came down with influenza shortly afterwards and ran a fairly severe course for about five days, followed by two days of practically normal temperature. Then, while the boy was still in bed, a severe broncho-pneumonia set in with elevation of temperature for thirteen days.

Present Illness. After eight days of normal temperature a slight rise of 100·4° (rectal) took place, on the following day it rose to 100° four times. No cough. Eating well. Put to bed.

Physical Examination. Temperature 100·3° (rectal). Well developed and fairly well nourished. Skin pale. Mucous membranes fairly good colour. Head: no retraction, no rigidity. Pupils equal, and react. Glands: cervical very slightly enlarged. Throat: tonsils moderately enlarged, no redness. Lungs: no dullness, no altered breathing, no räles. Heart: left border, one finger's breadth outside nipple line, right border at right sternal border, systolic murmur at apex transmitted to axilla. Pulse rate 112 lying down. There was considerable variation in rhythm with the slightest emotion, even while smiling pulse rate would jump to 120. Abdomen soft, distended moderately, no tenderness. Spleen not palpable. Liver just palpable. Extremities, knee jerks present and equal, no Kernig. The child was ordered to lie flat on his back for one month.

February 1st. Still in bed with one pillow. Pulse rate has been as low as 96, usually 104 to 108. Temperature ranges much the same. Eating well. Uurine normal.

March 31st. Still in bed. Heart, precardial dulness same as at first. systolic murmur greatest intensity at third left interspace. Blood pressure: systolic 90, diastolic 55. Temperature for three nights 100° to 100·6°. Pulse 104 to 106. White count, 10,000. Differential count: mononuclear cells 37, polynuclear cells 63.

April 1st. Still in bed, but sitting up. Condition unchanged. Eats well. *X*-ray of chest: apices normal, hilus normal, base normal, diaphragm normal, pleura clear. There is some widening of superior mediastium which is apparently thymus. The heart shadow is slightly larger than usual.

May 8th. Tonsils were removed, anæsthetic well borne. Cultures from excised tonsils showed hæmolytic streptococci.

June 1st. Still in bed. Temperature 100° to 100·5° each day. Has been sitting up in bed for one hour for the last few days. Blood culture positive for hæmolytic streptococci. Wassermann reaction negative. Noguchi modification negative.

June 13th. Autogenous vaccine 30,000,000 dead bacteria was given with slight local reaction in a few hours. June 8th. 60,000,000, no reaction. June 10th. 60,000,000, slight reaction.

Temperature June 10th, 99·3°, 100·3°, 99·4°. Temperature June 11th, twenty-four hours following vaccine 99·1°, 98·5°, 99·4°. June 12th. 175,000,000, marked local reaction. Temperature June 12th, 99·4°, 100°, 100·1°. Temperature June 13th, twenty-four hours following vaccine 99° each time; in general each twenty-four to forty-eight hours following vaccine temperature ran ½ to 1 degree lower.

July 1st. Sent to beach, allowed to sit up in carriage or on the sand in the sunshine. Eating fine. Heart murmurs disappeared. Heart boundaries the same. Still getting vaccine each three to four days, now given 1,000,000,000 dead bacteria each injection.

August 30th. Walking occasionally. A temperature rarely of 100·2° and pulse 110 while lying down. Still getting vaccine.

September 10th. Blood culture negative. All temperatures running under 100. Heart action appears satisfactory, although as a rule the rate is about 110, no murmurs. Pulse easily raised by slight emotion still.

November 1st. This boy runs and plays about as well as any child. He had, no doubt, an endocarditis and probably a myocardial weakness at the onset. The former boy perhaps did have a mild endocarditis. With the organism circulating in the blood I fully expected other foci of infection. We were apparently dealing with a low grade type of infection, in which rest in bed for months, tonsilar enucleation, autogenous streptococcus vaccine, sunshine, fresh air, and wholesome food were contributing factors in the restoration to health.

I am indebted to Dr. D. H. Hickson, formerly director of the Bacteriological Laboratories of the Puget Sound Navy Yard for the bacteriological work done on these cases.

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The Cause of Cancer.—Every worker who has persisted year after year in the attack on the cancer problem deserves a hearing. His experience and conclusions are likely to help dispel illusions, even if nothing positive is added to our knowledge. Hence we may well listen to the tentative convictions of Paine, who has long been engaged in investigations at the Cancer Hospital Research Institute in London, and who in a recent address (*The London Lancet*, October 2nd, 1920), points out that the clinical features of cancer in man are distinctive and strikingly unlike those of the inflammatory disorders of infective origin, for it is neither contagious nor infectious in the ordinary sense of the terms, nor does it show seasonal prevalence. Pointing out how often cancer arises under circumstances closely associated with the process of inflammation, the response of the tissues to injury which may be either physical or chemical, Paine feels justified in emphasizing the significance of this relationship. He believes that he has observed all stages and sequences from chronic inflammation of the breast, for example, to malignant mammary cancer. The process begins with inflammation and ends in malignant degeneration. Through the degeneration of the "nobler parts of the cell" whereby its function has been impaired, food brought to it is no longer used in the normal manner. A surplus may accumulate and may perhaps be "equilibrated by growth". In other words, the damaged cell, physiologically altered in its metabolism, starts to grow when its former specialized function is lost. "Nothing to do but grow" might paraphrase the behaviour tendency of the damaged cells. The disturbance in cell metabolism may, of course, be due to toxins of micro-organisms as well as to other noxious agents; but, in the words of Paine, the result of the damage is to disturb the balance of metabolism by impairing the special functions of the cell, and thereby causing persistent overgrowth. As the *Lancet* has pointed out, Paine's conclusions are based on observed variations in the morphology of cells which many persons may be unwilling to accept as conclusive; nevertheless, the deductions are entitled to a careful hearing. —*Journal American Medical Association.*

SOME ASPECTS OF FIBRO-PLASTIC TUBERCULOSIS IN THE EYE

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CASE 1. Some years ago a young girl came to me stating that she had had trouble in her eyes for two years or more and had most of the time been under treatment without benefit. It was a typical case of serous iritis, there being a pronounced tuberculous family history. No other lesion, excepting some enlarged glands could be found. Both pupils were contracted, occulded and secluded, a faint indication only of the fundus reflex being visible in the right eye. She was treated for a year with iodoform injections and there was then a fairly clear reflex in the upper part of the right pupil although details of the fundus were not visible. Suddenly the vision which had been improving became worse, there being apparently round celled infiltration of the media, but nothing to suggest tuberculosis in the attack. During the past five years there has been further determination of vision but no acute symptoms.

Case 2. As a contrast to this case in which active symptoms had disappeared before treatment was begun and only cicatricial tissue remained, the following one affords a very different clinical picture and result.

A man, aged about sixty, came with the pupil of the left eye occluded and secluded, the aqueous was turbid and in the anterior chamber was an exudate membrane which had covered the iris and pupil, but the upper part of which had become detached and was hanging free in the chamber. A single dose of $\frac{1}{4}$ gr. of iodine removed all evidence of plastic exudate and converted the clinical picture into that of septic iritis of a mild type, which soon disappeared. It is noteworthy that the subjective symptoms in this case were so slight, that the patient only had his attention called to the gravity of the condition by being asked by a friend, whether he could see with the eye, when he found that he could not. The fact that it was only after the removal of the plastic exudate that acute inflammatory symptoms supervened, is also worthy of remark.

Case 3. Recently a young girl aged six was brought by her mother, a trained nurse, who had noticed something strange about the child's eyes. So slight, however, was the change, that the other members of the family could see nothing amiss. Examination showed a faint uniform haziness of both corneæ and there was complaint of frequency of micturition by day as well as at night. She was treated expectantly, while a thorough examination was made by her physician; the report was negative, the urine, however, was not centrifugalized. After about two weeks the density of the corneal haze had increased so much that the child could only distinguish large objects. By this time, too, there were marked photophobia and ciliary injection present, while the urinary trouble was causing great distress. From the insidious onset of the disease in the eye, and the irritable urethral condition, a tentative diagnosis of tuberculosis was made. The child was given iodine hypodermically and made an uninterrupted recovery, the urinary condition showing very distinct improvement before any change in the eye was evident.

This case seems to furnish a corollary to the observation published by Clapp (*Am. Journ. Ophth.*, Vol. 2, page 58), that antisyphilitic treatment gives no result in tuberculous interstitial keratitis, and my own cases indicate that little benefit is to be expected from the use of iodine, when this disease is syphilitic in origin.

Case 4. Another case showing undoubted effects of concurrent or intercurrent septic infection was that of a man of fifty odd years of age who had for two years been under antisyphilitic treatment. The Wassermann reaction was negative at the time when I saw him and remained so. There was no central vision in the right eye owing to degeneration in the macular region, which was of the ordinary septic type. The left eye showed extensive proliferating retinitis in the cicatricial stage, the exudate covering most of the vessels and disc. The vision was 6-60, which under iodine treatment increased to 6-18 and then receded, the loss of sight being due to changes in the macular region.

This case I had regarded as syphilitic, basing the opinion on the history and the statements of certain authors as to changes of this type, and have so reported it (*Brit. Journ. Ophth.*, Vol. 2). It does not, however, conform in type either clinically or pathologically to syphilis or tuberculosis, and an attack of round cell inflammation with acute symptoms which he had while under observation is definite evidence of the presence of some other active factor.

Recently Jackson and Finoff (*Amer. Journ. Ophth.*, Vol. 2, page 715) have reported three cases of retinal tuberculosis with proliferating changes in the eye and referred to two others, but as most of the cases of this character published show no clinical evidence of tuberculosis it has, if present, evidently been greatly modified by some other factor.

These cases illustrate the occurrence of fibroplastic tuberculosis in several different forms. The clinical picture and pathological changes found in them are quite distinct from those which occur in the type which is characterized by abundant tubercle formation with caseation or necrosis, and the conditions found in the two types are so sharply defined that one is forced to conclude that there is an essential difference in the ætiological factors. In view of the facts, one naturally questions the accuracy of a diagnosis of tuberculosis in these cases or at least whether the tubercle bacillus is the dominating factor in them. Kruckman quoting Von Michael, Grafes' Hand-Book, chap. 6, page 90) postulates the occurrence of serous iritis in the absence of visible tubercle formation but does not go so far as to suggest that the bacilli, too, may be lacking.

There is little doubt that the fibro-plastic exudate often limits, or may even terminate, the tuberculous infection, and many of the reports of this type of inflammation, published, show no clinical evidence of tuberculosis. The Von Pirquet reaction too, is frequently negative.

This fibro-plastic exudate, the main characteristic of these cases, is accompanied or preceded by a round celled infiltration of the tissues which is clinically indistinguishable from the condition associated with plastic exudate in cases not usually considered tuberculous, such as is found for instance, in sympathetic ophthalmia and in some forms of glaucoma.

As fibro-plastic exudate does not occur to the same extent in other forms of tuberculosis it is probably not due to the tubercle bacillus but to some complicating infection and there are some observations which indicate that certain strains of pneumococci and staphylococci may be the cause of this interesting variant, while the streptococci are active in the more ordinary type of tuberculosis, but, the evidence is limited and incomplete. In searching for analagous conditions in other organs in the body one naturally thinks of lupus vulgaris and fibrosis of the lung. The clinical course in these affections so strongly resembles that in the cases given above, that it is reasonable to conclude that there is a close relationship in the causal factors.

The determination of the germs which are the cause of this type of tuberculosis will naturally have a very practical bearing upon the treatment to be followed. There are, so far as I know, no facts on record which indicate that tuberculin has any effect whatever upon the organisms, present with the tubercle bacillus, in tuberculous lesions, yet the frequency with which one finds various tuberculins recommended, to the utter exclusion of all consideration of mixed infection, is, to say the least, striking. The idea too, of determining just what "mixed infection" implies in connection with tuberculous lesions, as yet does not seem to have assumed a concrete form.

The reports given above show that in the two recent cases the effect of iodine was very prompt and satisfactory while in the others it was not so, emphasizing again the necessity for early treatment, which has so often been insisted upon. The method followed, directly violates the principle of maintaining and strengthening a fibrous barrier around the lesion and strives to remove infection, by preventing its localization and throwing it into the circulation, where it is more easily disposed of, provided that the lesions be not too extensive.

These cases then indicate strongly, the advisability of early treatment and the necessity of more extended research into the underlying causes of the various types of so-called tuberculosis. Whether the facts justify grouping these cases together and including in the category cases of pseudo-glioma and the analogous cases of conglomerate tuberculosis occurring in the anterior chamber and anterior part of the uvea, and whether the tuberculous infection dominates the disease sufficiently to justify a diagnosis of tuberculosis, is open to question, and I should be very pleased to hear the matter discussed.

RECURRENT DISLOCATION OF THE SHOULDER JOINT

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DIFFERENT joints in the body owe their strength to different factors. In some the shape of the bones taking part in the articulation is in itself an obstacle to dislocation. This is notably so in the hip-joint and in the humero-ulnar articulation. In other joints, strong ligaments serve to keep bony surfaces in apposition. The knee joint is a conspicuous example of this kind. Still other joints depend mainly on the action of muscles for their security. Of these the shoulder joint is typical.

Look at the surfaces which make contact. On the one hand there is the flat or very slightly concave glenoid cavity of the scapula, deepened to a slight extent it is true by the glenoid ligament, but still relatively a flat surface. On the other hand we have the globular head of the humerus, of which not more than a small portion can make contact with the glenoid cavity at any one time. The ligaments around this joint also contribute very little to its security. The capsule is of moderate strength but is not capable of withstanding a severe strain, such as is put upon it by a sudden stress of considerable intensity. Such resistance to dislocation as the joint shows is due for the most part to the muscles that pass over the joint.

Let us consider the movements that may take place at the shoulder joint. They are extension or backward movement of the upper limb, flexion or forward movement, abduction or movement of the arm away from the body, and aduction or movement of the arm towards the body. In addition there are rotatory movements, medial and lateral, and circumduction movements in which the arm traces the outline of a cone of which the shoulder joint is the apex. None of these movements, when carried out slowly and with all the muscles on guard, will cause any inconvenience. The pectoralis major, the latissimus dorsi and the teres major, among their other actions, keep the head of the humerus pressed down on the glenoid surface while the anterior deltoid fibres, the coraco-brachialis and the biceps, flex the joint; the posterior deltoid fibres and the teres major extend it, the middle deltoid fibres abduct and the first mentioned muscles adduct. The supraspinatus, infra-spinatus and teres minor act as lateral rotators, and the subscapularis is the chief medial rotator. The four last mentioned short muscles are of material value also in keeping the bony surfaces apposed. Note, however, the position of the insertions of these muscles. The lateral and medial rotators are attached to the greater and lesser tubercles respectively over an area situated a short distance from the promixal extremity of the bone.

Dislocation of the head might occur theoretically, upwards, downwards, forwards, backwards or in an intermediate position. Dislocation upwards is prevented by the strong structures which overlie this aspect of the joint, by the coraco-acromial ligament, by the acromion process, and posteriorly by the coraco-humeral ligament. Dislocation forwards is prevented by the very powerful subscapularis tendon, by the long tendon of the biceps and by the fact that a force acting to drive the head of the humerus forward would probably either slip past the rounded shoulder eminence or set in motion the mobile scapula. In addition the anterior aspect of the capsule is specially strengthened; the thickening being known as the gleno-humeral ligaments. A backward dislocation is similarly resisted by the united force of the three lateral rotators.

The one aspect of the shoulder joint that is a source of weakness is the inferior aspect. Here the capsule is comparatively weak and the only muscular support is derived from the long head of the triceps, a muscular factor which from its alignment and its contour is not a very potent one. Dislocations, we may take it, practically always occur through the inferior part of the capsule, and they always involve a tear of the capsule.

A further consideration is to be found in the position occupied by the scapula. This is not—as is often supposed—in the coronal plane, but at an angle of about 45 degrees to it. The glenoid cavity thus looks forward as much as outward. This direction tends to render a backward dislocation more difficult. In these three directions—upwards, forwards, backwards, dislocation is almost unknown.

Now what is the mechanism of dislocation? This accident always occurs when the arm is outstretched, combining some degree of flexion or extension with abduction. There is always some degree of abduction. In other words, the deltoid muscle is always active when a dislocation occurs. We may go further and say that from the point of view of the stability of the joint, the deltoid is a dangerous muscle. Without an active deltoid, dislocation is not very likely to occur. Cases of dislocation have happened where the head of the humerus was pulled from its bony socket, *e.g.*, by the sudden starting of a vehicle of which the patient had hold. These, however, are comparatively rare. The classical ætiology is a fall on the outstretched hand or elbow.

Next let us consider the way in which a stress is applied to produce a dislocation. As a typical example we may consider a dislocation resulting from a fall on the outstretched hand. The fixed point in the system is the region of insertion of the subscapularis and the lateral rotators. The short arm of the lever is the axial distance from that insertion to the point of contact of head of humerus and capsule. The long arm of the lever is the axial distance from the point of insertion of these muscles to the point of application of the force upon the outstretched hand.

The moment of the force acting on the system is the force with which the outstretched hand meets the ground multiplied by the length of the long arm of the lever, (presumed rigid), and is equal to the moment produced by multiplying the force with which the head of the humerus bears on the capsule by the length of the short arm of the lever. The most cursory consideration must convince us that the force with which the head bears upon the capsule is just as many times greater than the force with which the hand strikes the ground as the length of the long arm of the lever exceeds that of the short arm. The result is that the capsule *per se* is inadequate to meet the strain, and gives way. The action of the deltoid still further aids the dislocating force, as outlined in the accompanying diagram.

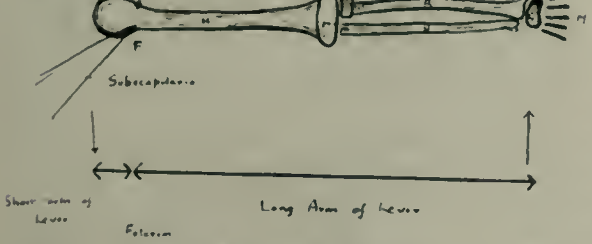

Fig. 1—The leverage responsible for the Primary Dislocation

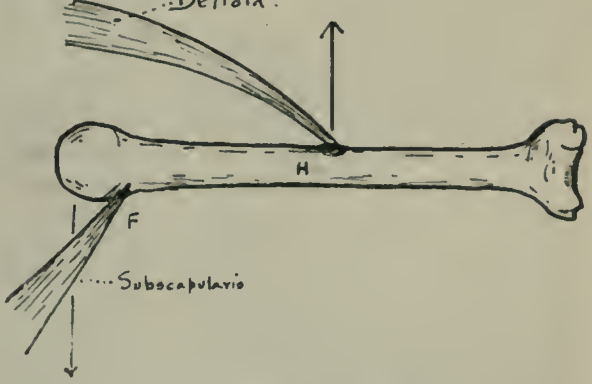

Fig. 2—Action of the Deltoid in Promoting Dislocation

In certain cases it may be that the deltoid itself, without the application of any force to the extremity of the lever, can bring about a dislocation. This is probably not the usual mechanism of the primary dislocation.

It is sometimes said that the coraco-acromial arch forms a species of fulcrum over which the dislocating force acts. It may be pointed out that the scapula is so mobile that this explanation of the accident, tempting as it may seem, is probably never correct.

The rent in the capsule is or is not repaired. If it be not repaired then "facilis est descensus Averni". If it be repaired the repair can occur only by the formation of scar tissue. In place of the beautifully interwoven fibres of the normal capsule we have a cicatrix. A strain that the normal capsule would resist with ease proves too much for scar. In other words the stress required to produce a second dislocation is much less than that which is necessary for the first. Of a truth, "Ce n'est que le premier pas qui coûte." One dislocation succeeds another until the accident will follow upon the most trivial of stresses; indeed the deltoid itself, without the application of any extreme force, may produce the condition. When such a state of affairs is present we are entitled to speak of it as "Recurrent Dislocation".

Scar tissue under the most favourable conditions, forms but a poor substitute for the interlacing fabric of the normal capsule of a joint. Its resistance to a sudden severe strain is very much less and prolonged steady pressure or frequently repeated moderate pressure will stretch it to almost any degree.

The treatment of the condition may be conservative or operative. Conservative measures consist essentially in the wearing of some restraining apparatus, *e.g.*, a band around the thorax, attached by a strap to another band around the arm, the apparatus permitting of a very limited amount of abduction. It is evident that under no circumstances, with this arrangement in position, can the arm be raised above the head. A joint hobbled in this way is little better than useless. If a satisfactory operative measure can be found which adjusts the disability once for all, restoring to the joint practically unimpaired movement, it is decidedly preferable.

When one finds a multiplicity of operations to remedy a defect, one may be quite sure that all fall short of the ideal in some respect. Few conditions illustrate this more strikingly than that of recurrent dislocation of the shoulder joint. For the most part these consist of some form of capsulorrhaphy, and no doubt a considerable measure of success has attended this operation. In performing it, the deltoid muscle is incised far forward so as to interfere as little as possible with its nerve supply. The capsule or the joint is then incised and a flap is folded in a "double breasted coat" manner so as to produce a two-fold thickness over the anterior aspect of the joint.

All such operations are open to the criticism that the weak part of the capsule is the inferior aspect, and unless added suport is given here the measure adopted may prove inadequate.

Young, in the *Journal of the American Orthopædic Association*, October, 1913, recommends division of the lower part of the tendon of the pectoralis major muscle, and also that of the lattissimus dorsi. The reason for this proceeding is not at all clear from his paper. Only very rarely can these muscles be to blame for a dislocation by reason of their over-action.

Rich thinks that rupture of the supra-spinatus, sub-scapularis and teres major usually occurs, and points out that epileptics seem to have a special disposition towards this accident. The latter observation is no doubt a correct one. One would expect that in a joint, of which the main strength lies in muscular support, accidents affecting it, when that muscular support was not consciously applied, would result in dislocation. For treatment he recommended the insertion of "a double band of silk ligament between scapula and humerus" these being secured in position by drilling the humerus and the axillary border of the scapula. This operation, however, does not seem to have found much favour. At the best it must involve a certain limitation of movement at the shoulder joint itself.

It should be recognized that the deltoid muscle, and especially the middle fibres of that muscle, constitute a source of danger, if they are set in action without other muscles co-ordinating their action to maintain the stability of the shoulder joint. If some measure could be adopted whereby as soon as the deltoid goes into action an automatic guard is supplied to the under aspect of the joint capsule, this automatic guard not interfering with the free movements of the joint at other times, a much better solution of the problem would be attained than by limitation of the range of movement. Such an automatic arrangement is provided by the Clairmont-Erlich operation, in which a portion of the deltoid itself is employed as a muscular guard. The deltoid is "hoist with its own petard". The principle is the detachment of a portion from the posterior border of the deltoid muscle, and its insinuation through the quadrilateral space to an attachment at the coracoid process. The nerve supply of the segment of the deltoid is retained intact so that on the assumption of the danger position by means of the deltoid fibres, a muscular sling gives active support to the threatened aspect of the capsule.

As the details of the operation are not generally known, it may not be out of place to recapitulate them briefly.

The patient is placed lying upon the sound side so that ready access is gained to both front and back of the shoulder without the necessity of disturbing his position. The arm is draped separately as it requires to be moved during the operation. An incision is made from the coracoid process along the anterior border of the deltoid to a point below the insertion of that muscle. The cephalic vein is identified and retracted to the outer side. The delto-pectoral groove is opened up and the pectoralis major is detached from its insertion. This brings into view the two heads of the biceps muscle, and dissection is carried out between these. The glistening tendon of the latissimus dorsi soon comes into view lying upon the muscular fibres of the teres major. The upper border of the latissimus corresponds with the lower boundary of the quadrilateral space so the axillary nerve is in no danger. The tendon of the latissimus dorsi is almost severed, or indeed completely so, from its bony mooring and a similar fate is bestowed on the teres major. The object of this proceeding is to make sure that the quadrilateral space is fully opened up from the front. When this is done the finger is passed into the quadrilateral space, dilating it somewhat.

Clips are then applied to the anterior wound and the posterior aspect of the shoulder is next approached. A long incision is made just over the posterior border of the deltoid, extending from the spine of the scapula to below the deltoid insertion. The skin and superficial fascia are dissected from off the posterior part of this muscle and the insertion is laid bare to its very lowest limits. Commencing below and making sure to include some of the fibrous insertion of the muscle into the humerus, a strip about three-fourths of an inch in width is dissected from the posterior border. As this is traced carefully the nerve supply coming from the axillary will be found entering it, accompanied by blood vessels. This nerve supply must be carefully preserved or the operation will have failed in its main object. It is not necessary to dissect the deltoid strip as high as the scapular spine.

The finger is then passed from the anterior wound through the enlarged quadrilateral space, emerging posteriorly. A long pair of forceps is then passed through this opening, and the extremity of the deltoid flap is grasped and pulled through the quadrilateral space from behind forwards. Provided the space has been sufficiently enlarged this manœuvre presents no difficulty. If a sufficient length of deltoid has been detached, the tip of the flap reaches easily to the coracoid process where it is firmly anchored to the peristeum with silk. The sides of the flap near the tip can be attached to neighbouring structures for greater security.

It only remains to reunite the severed pectoralis major to its insertion. The latissimus dorsi and teres major may be left to take care of themselves. Union occurs through the medium of a small amount of scar tissue. The superficial wounds are then sutured. No drainage is necessary.

The arm is bound to the side for ten days, after which the sutures are removed. Thereafter for another ten days a sling is employed. At the expiry of three weeks the sling is withdrawn and perfect freedom permitted. Full movement is usually attained in another ten days or so.

Jones reported two cases dealt with by this method. The first was a failure, the second a success. In his opinion the causes of failure were as follows:

1. Too short a deltoid flap.
2. Insufficient enlargement of the quadrilateral space to allow of easy manipulation.
3. Insufficient fixation of the flap to prevent it returning to its original place.

Personal experience of this operation now amounts to seven cases, not one of which, curiously enough, is an epileptic. The results of the operation are so far uniformly favourable. The earliest was done in January, 1918, so that considerably over two years have clapsed since interference, without the slightest indication of return of the disability. During this time the patient has been doing much heavy work so that the joint has emerged successfully from considerable and frequently sudden strains.

The clinical histories are summarized below:

1. Gnr. W., age nineteen. Complained of recurrent dislocation of the right shoulder. He does not know how often it has occurred altogether, but the joint was "out" on five occasions during the month of November, 1917. On January 11th, 1918, a deltoid flap was transplanted. No recurrence. It was reported to me in April, 1920, that he had dislocated the shoulder again by falling on the icy sidewalk. I sent for him at once and having convinced myself that the history was not that of a dislocation I had him put his hands straight above his head, and photographed him in this attitude. The photograph is shown herewith and is I think fair evidence that the accident he sustained was not a recurrence.

2. Pte. P., age thirty-four. Former occupation, bartender. This patient came in holding his arm to his side. He does not know how

often the right shoulder has been dislocated, but the slightest unguarded movement will result in the accident. On the 10th, December, 1918, a deltoid flap was transplanted. Unfortunately this patient developed influenza, with pneumonia as a complication, and his wounds suppurated for about ten days. After that healing was complete. Practically all the suppuration occurred at the lower end of the wounds. No recurrence.

3. Mr. L. D. M., age thirty-one, grocer. Recurrent dislocation of right shoulder joint since he was eight years old. He thinks it has occurred in all about a dozen times. The last occasion was in February, 1919, as the result of a slip on the sidewalk. He threw up his hand and the shoulder went out of joint. On March 10th, 1919, a flap was transplanted from the posterior border of the deltoid. Healing occurred at once. No recurrence.

4. Pte. T. F. S., age twenty-six. Was sent by the Board of Pension Commissioners. Dislocation of the right shoulder joint occurred first in 1915 while he was doing physical training. In all the shoulder joint has been "out" six times. On May 10th, 1919, a flap was transplanted from the posterior border of the deltoid. He was last seen on July 7th, 1919, when movements of the shoulder joint were unimpaired. No recurrence to date.

5. Mr. P. S., age forty-two, junk-dealer. Dislocation of the left shoulder joint has occurred in all about twenty times. Comparatively little force is needed to bring this about. On May 14th, 1919, transplantation of a deltoid flap was performed. Healing occurred without incident. No recurrence.

6. Pte. B., age twenty-seven. Recurrent dislocation of the right shoulder. States it has been out "fifty times." The last dislocation occurred while he was turning over in bed. On July 30th, 1919, transplantation of deltoid flap was performed. The extreme muscularity of this patient was the only source of difficulty. No recurrence to date.

7. Mrs. J., age forty-four. On December 20th, 1919, while she was reaching for some article on a high shelf of a cupboard, her foot slipped, she over-balanced, and pulled the cupboard over on top of her. When seen the left shoulder joint was extremely moveable, dislocation being apparently producible by the slightest movement. *X*-ray negative. I decided to treat the case as for recurrent dislocation. At operation, February 15th, 1920, the long tendon of the biceps was found to be ruptured, a complication probably occurring much more frequently than one imagines. Transplantation of a posterior deltoid flap was performed and the wound healed without incident. She is already doing all her own housework. A somewhat interesting concomitant of the operation, in this particular case, is its psychic effect. Considerable mental depression, probably associated with the onset of the climacteric, had existed, and was largely focussed in the painful and useless shoulder joint. Since her operation the improvement in the mental condition is considerable.

Some cases of habitual dislocation are better left alone, as *e.g.*, when the dislocation enables the patient to perform movements that would otherwise be impossible. An example of this is afforded by the case of E. P., age thirteen. At the age of two she suffered from an attack of poliomyelitis which affected both lower limbs and both upper limbs. Among other muscles the deltoid on both sides suffered severely, as did the external rotator muscles of the shoulder. In spite of this she is able to raise either arm above the head, although she is unable to perform this movement with both upper limbs simultaneously. The movement is accomplished by first of all producing a voluntary subcoracoid dislocation of the humerus. In all probability the long tendon of the biceps acts in this position as a species of suspensory ligament. The pectoralis major and the teres major can then act upon the limb elevating it to a slight extent. By a sudden jerk the arm is thrown upward and retained in the upright position by the action mainly of pectoralis major and teres major, assisted by a few of the posterior fibres of the deltoid, on the left side particularly. This is a case which really deserves the epithet of "habitual dislocation", and is a very instructive example of how a muscular defect can be compensated by the use of other muscles.

Some of the cases dealt with by this operation have not yet undergone sufficient test to enable one to pronounce with certainty on the value of this operation in the treatment of recurrent dislocation of the shoulder. Since this paper was completed there has been reported a series of four cases by Ollerenshaw to the British Orthopædic Association. In his paper a very cheerful view was taken of the matter; one's own experience to date encourages one to share it. Indeed, when a case of this disability is encountered, the remedy is prescribed with more confidence than in the case of many procedures of older standing and higher reputation. The principle of the operation is undoubtedly correct, and its application requires no more than the ordinary degree of surgical skill, combined with some confidence in recognizing anatomical landmarks.

NOTES ON EPILEPSY

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A REVIEW of recent literature published under the title of epilepsy contains matters of practical and theoretical interest, although it cannot be claimed that much advance has been made towards clearing up the obscurity in which the real nature and origin of this mysterious affliction still remains.

A subconscious wish to flee from reality and return to prenatal conditions, by losing self-consciousness and making movements apparently purposeless, or at any rate not directed by higher psychic levels, is offered as an explanation of the phenomena of epilepsy by Pierce Clarke; and along this line of thought we find an article giving an account of Head's discussion of pyschic levels and control, in which he says that in view of recent researches our views of epilepsy need drastic revision. He describes the whole nervous and mental mechanism as a structure built up as a series of functional levels, each of which guides and controls the level below it. For instance, in certain lesions in which control is cut off there is dorsi-flexion of the toe and loss of bladder control, the disturbance reaching comparatively low levels, as in many epileptic seizures; whereas, in hysterical fits, only higher levels are involved and these phenomena do not occur. Admitting that the emotions, acting as part of various instinctive forces, are the driving forces of co-ordinated activities, but acting unchecked result in inefficient utilization of energy, and that below the developed emotional level there are various less co-ordinated mental activities which psychotherapy in its investigation of the unconscious is gradually bringing to light, an attractive hypothesis presents itself, namely that unconscious forces, as yet little understood, through disturbance of the higher emotional levels and cutting off of psychic control, produce outbursts of non-regulated motor activity. Head believes that many fits labelled epileptic are hysterical, especially in those cases in which epileptic fits have appeared during childhood and continued for several years, and then after a quiescent period lasting a number of years, convulsions have reappeared. In hysterical fits suggestion, acting through the subconscious mind, will tend to modify the neurone paths through which the motor activity finds expression.

Many organic conditions of the brain have been found in association with convulsive fits, such as gliosis of the cortex, dilatation of the ventricles, adherent membranes, and much emphasis has been placed upon heredity, toxic conditions, notably alcohol and lead, and the effects of infectious diseases; but, as yet, no satisfactory explanation is forthcoming as to why or how convulsive seizures appear in certain individuals and do not appear in others with similar brain lesions, or exposed to the same toxic or infectious influences. Nor has it been proven, once we admit that every convulsion is followed by damage to the brain tissues, that gliosis, for instance, may not be the result rather than the cause of convulsions.

The peculiar mental and emotional make up of the epileptic, his supersensitiveness, irritability, impatience of being inferior to the average in any respect, unless so much deteriorated that his insight is lessened or lost, his tendency to introspection; all these factors are outward and visible signs of emotional instability which it is easy to picture as running over sometimes in waves of uncontrolled action, just as an ordinary man when very angry may lose control, clench his fists and stamp and swear. And the epileptic when angry may have a peculiar seizure in which he does not lose consciousness but works his face and limbs spasmodically, and we are apt to call this hysterical. And so the line between hysteria and epilepsy tends to become blurred once we fall into line with Head's conception of functional levels, for according to this conception the difference is principally a matter of degree, or rather of height of level. Besides, if suggestion working on the unconscious mind can alter certain neurone paths in the one condition, one asks, why not in the other?

We are naturally attracted towards the hypothesis containing the elements of hope and promise of better things, of more rational and effective treatment. A more hopeless or depressing task than handing out bromides, week after week, to a number of epileptics and watching them deteriorate is hard to imagine. Besides, an appeal to our sense of the mysterious is always attractive, and the subconscious or unconscious mind is still a comparatively undiscovered country.

And the presence of organic changes in many cases of epilepsy is not necessarily opposed to this theory, for the latter is based on functional disturbance, and it is quite conceivable that this may exist as a result of or coincidently with organic changes.

No matter whether we are inclined to agree with Freud in his theory of repression and fixation of infantile sexual (in the largest sense) tendencies, or with Jung in his idea of "laziness", or with Adler in his "organ inferiority" idea, as the basis of psychoneuroses, it is certain that the researches of these men and their followers have modified profoundly our views as to the nature of the psychoneuroses and psychoses through the study of the unconscious and its influence on our conscious life. Is it not reasonable then to apply the same method of investigation to cases of convulsive phenomena in which no toxic or organic causes can be demonstrated but in which psychic disturbances, peculiarities of disposition and tendency to mental deterioration are common?

One stops to think when one young man, an epileptic, with mental and moral regression, volunteers the statement that he dreams nearly every night and that frequently he knows a fit is coming on because he becomes aware of the same dream thoughts going through his mind. Is it far fetched or too fanciful to consider a possible relation between his subconscious mind and his attacks?

The process of psychoanalysis is a time consuming affair, but in selected cases might be productive of good results if subconscious conflicts could be thereby eliminated. But even stopping short of such deep investigation, a thorough study of the personality of each patient as far as his conduct and conscious mind are concerned should be made. Mental twists and peculiarities can be straightened out to some extent and habits of life improved.

It is taken for granted also that every patient is examined from every standpoint, namely organic disease, endocrine disturbance, Wassermann reaction, measurement of intelligence, and neurological and psychiatric examination; in short, not to be content to make a diagnosis of epilepsy, write it on the card, and prescribe bromides or luminal. This latter is not progress; it means regress for the patient.

But for many years it has been known empirically, without any delving into the unconscious mind as the possible origin of ill-regulated activities, that regular work is a good thing for epileptics. The Craig Colony report of the marked reduction in the average daily dose of bromide per day per patient, as the system of regulated work has become perfect, is a striking testimony of the efficacy of work.

In March, 1920, the writer was permitted to take charge of the cases of epileptics attending the Royal Victoria Hospital for special study. It happened fortunately at this time that we were able to get a supply of luminal, and there was opportunity to compare with results of luminal with the recorded result of bromides in these patients. The most notable change was the disappearance of mental depression. In most of the cases the average number of attacks diminished, while in others little difference was noted. Some patients react remarkably well to luminal. For instance, one boy aged nineteen, who had been having attacks for several years, has not had an attack for fourteen weeks, a record unknown in his case under bromide. A girl, aged twenty-five, who formerly had such severe depression that she had no interest in life and had meditated suicide, has become quite cheered up. We cannot multiply instances, as space forbids. But we are certain that as long as the supply of luminal holds out we are not going back to bromides. No toxic results have appeared, excepting mild drowsiness at first in one or two cases, which promptly disappeared on omitting the drug for a day or two, and in one instance a condition resembling alcoholic intoxication in a young man who had been taking two grains three times a day for a few days. Also, one patient developed a rash resembling measles on the arms and trunk. We are certainly in accord with Dercum, Grinker and others, that luminal is superior to bromides as a sedative in epilepsy. It remains to be seen whether it has any curative properties, but it has been found in some instances that, after discontinuing the use of the drug, the attacks have returned with their former severity.

The necessity therefore for providing occupation for these patients became apparent, and so came into existence the organization now incorporated as "The Montreal Industrial Institute for Epileptics". A class was started under the auspices of the National Committee for Mental Hygiene, but financially independent, in May last, with four pupils under the instruction of Miss Nagle, formerly military aide, and has continued. The number of pupils has increased to twelve, the additional pupils coming from the Royal Victoria and General Hospitals. Instruction is given in basketry, weaving, bookbinding, chair-caning and other trades. There is no question in the writer's mind that the work, the instruction, the cheerful atmosphere of the class, the friendly rivalry, and the prospect and realization of earning money have effected a marked improvement in the mental status of the pupils, generally speaking, although it is impossible to estimate whether it has actually helped in reducing the number and severity of their attacks. It is beyond question that the pupils have now an attitude of hope and cheerfulness which was lacking before. They are now useful and productive members of society, even though to a limited extent, and there is a prospect of their efficiency and earning power increasing. It is the object of the association to teach occupations which the pupils may continue at their homes after they have left the class, so that they may become self-supporting.

It has been found that on practical grounds epileptics markedly deteriorated, mentally or morally, are not suitable for the class, nor those subject to frequent attacks before these have been fairly well controlled by sedatives.

The attention of the medical profession is called to the existence of this Industrial Class, and their sympathy and support are solicited.

Dirty Money —It is too bad that the great bulk of the paper money at present in circulation is so dirty. We often hear money spoken of as filthy lucre. There is a particular significance to the term to-day, for it is impossible to imagine our paper currency with a filthier or more soiled aspect. It is to be hoped that conditions may soon make it possible for the Treasury Department to call in the dirty money that the people have been forced to use, and either give it a good bath or else issue "something just as good" in its place. This does not mean we countenance substitution, but we are willing to make an exception in the exigencies of the situation. The bath we suggest, moreover, should not be an "immunity bath", for we do not want the cleansing process to absolve even the humblest dollar bill, this coming year, from any of its obligations or responsibilities under the law.

To speak in a more serious strain, there is real danger from paper money as dirty as that which we have been using. Not only do the roughened, minutely frayed surfaces of worn and soiled bills favour the collection of germs, but these, with grime and dirt, work their way into the tiny seams and almost microscopic cracks. Passed, as they are, from person to person, many of whom know next to nothing of cleanliness, it takes no very vivid imagination to invision innumerable ways whereby money may be germ contaminated. Money then becomes a germ carrier, with all the potential dangers of a transmitter of infective material. The subject might be elaborated in greater detail, but enough has been said to emphasize the conditions that exist. The appearance of quite a little new paper money around Christmas time leads to the hope that the filthy lucre we have been using will soon disappear. If only for appearance sake, we would welcome this prospect, but when we think of the hygienic benefits, the possibility becomes doubtly pleasing.—*American Medicine, December*, 1920.

A PLEA FOR THE MORE GENERAL USE OF LOCAL ANÆSTHESIA

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EVER since Richardson in 1866 demonstrated the possibilty of anæsthetizing the skin by means of ether spray, the subject of local anæsthesia has received considerable attention, but nothing of any great importance was accomplished until the introduction of cocaine by Koller[1], of Vienna, at the Heidelberg Ophthalmological Congress in 1884. For centuries the South American Indians have recognized the invigorating qualities of coca leaves when chewed and this fairly general habit was responsible for the discovery of the most valuable medicinal property of the plant because numbness of the tongue from local contact with the drug is quite as apparent as is the constitutional effect.

Naturally topical application was tried first and the new drug soon established itself in the field of ophthalmology as well as of rhinology and laryngology in rapid succession. That cocaine has been of great service in the above mentioned specialties is well vouched for by the prevalence of its use at the present time, but the drug has no such record when injected into the tissues, and the dangers in connection with this method were recognized early so that diligent search for a safer local anæsthetic has occupied the attention of medical science even up to the present day. The first solutions of cocaine were used much too strong and the success which has attended the use of the various combinations of drugs for local anæsthesia has well borne out this fact. Schleich's solutions, which used to be so popular, contained as little as 0·01 per cent. of cocaine combined with morphia and sodium chloride. That the morphia was of much assistance constitutionally we are quite ready to admit, but we have long since known that the local action is entirely due to the cocaine, assisted by the pressure created in the tissues by the large volume of salt solution.

In the effort to get away from the toxicity of cocaine, Braun, Reclus, and Legrand introduced eucaine, and Custer brought tropacocaine to the attention of the profession, but both were found to be much less potent and more evanescent than cocaine. Stovaine, alypin, holocaine, aposthesine and various other drugs have been introduced and all have their merits, but it seems to me that more nearly the ideal has been reached in novocain than in any of its predecessors. Braun's[2] demands for a local anæsthetic are as follows: That the drug should be less toxic than cocaine proportionately to its local anæsthetizing power; that it should not cause any damage to the tissues; that it should be soluble in water and easy to sterilize when in solution and finally that it should be capable of being combined with some adrenal preparation. Novocain measures up to all these standards and is now manufactured in the United States by several firms and marketed under the name procain.* It was discovered by Einhorn in 1905 and is a synthetic chemical, readily soluble in water and may be heated to 120° C. without decomposition. Aqueous solutions are decomposed by alkalies—a point of practical importance in the sterilization of syringes and containers as even a trace of alkali will precipitate the anæsthetic solution and destroy its potency.

Dosage. In so far as I have been able to ascertain, novocain is practically nontoxic and I have frequently used 100 c.c. of half per cent. solution without the slightest inconvenience to the patient while I recall one case where 200 c.c. was used in the excision of a pilonidal cyst. The drug seems to be so free from toxicity that large quantities of weak solutions may be used with impunity and this factor is of great assistance in producing real anæsthesia over a sufficiently large field to facilitate a complete operation without causing the patient any pain.

Strength of solution. For ordinary use in loose tissues half per cent. solution, as recommended by Braun, will give perfect anæsthesia and the weak solution is an advantage because of the additional volume of liquid at one's disposal. For bone work a one per cent. solution is better because the quantity of liquid which may be injected beneath the periosteum is quite limited. Stronger solutions up to four per cent. are frequently useful for blocking particular nerve areas such as in surgery of the mouth and maxillæ while still stronger solutions are in popular use for topical application to mucous membranes. It is especially valuable in urethral work because of the well-known danger of cocaine in this region.

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*Manufactured and marketed in Canada under the name of ANOCAIN.

Addition of adrenalin. This addition serves two very useful purposes. In the first place the length of anæsthesia may be prolonged by the judicious use of the adrenal product and secondly, the hæmostatic effect is of great assistance during the operative procedure. In this connection it is well to remember that the danger of post-operative hæmatoma is much in evidence and more perfect hæmostasis is necessary than when operating under a general anæsthetic. A strength of 1-200,000 is generally useful but in very vascular areas or when prolonged anæsthesia is required, the strength may be increased to advantage even up to 1-40,000. In plastic work when the vitality of sliding flaps enters into the consideration, it is well to work with as weak an adrenalin content as possible. Especially is this a fact if the pedicle of the flap is either very long or very narrow as one may quite readily destroy the flap by shutting off the circulation with too much adrenalin. The combination of an adrenal product with the anæsthetic has been one of the greatest factors in bringing local anæsthesia up to its present state of perfection because absorption is retarded directly according to the quantity of hæmostatic employed thus allowing the nerves to remain bathed in novocain.

Preparation of patient. In operations under local anæsthesia the psychic element plays a very important part and we might well state the fact here that all patients are not good subjects for this method, although much depends upon the personality of the surgeon and his ability to "handle" the patient. A mild hypnotic such as sulphonal or veronal on the preceding night is good practice to insure sleep and a hypodermic of morphia should be given half an hour before operation. Hyoscine is frequently combined with the morphia but the drug is in my estimation too dangerous for general use, and I have seldom seen the necessity for such a combination. A good tactful nurse does well as a psychic anæsthetist to keep the patient engaged in conversation and otherwise detract his attention from the work in hand. Organization in the operating room should be so perfect that talking on the part of either the surgeon or his assistants is reduced to a minimum. A reference to bleeding or the mention of instruments which ordinarily cause pain may quite easily disturb the patient's equilibrium and suggest painful sensations when the manipulations in progress are really not causing him any actual distress.

Technique. One of the most important steps is the provision of a very liberal anæsthetic field for the operation and failure to do this very thing accounts for many of the cases that we have all seen where the operation has been performed under great difficulty and with much anguish to the patient. By the use of a long fine needle it is very easy to infiltrate a large area and the only pain to the patient should be the initial puncture. Working subcutaneously and depositing solution all the while it is quite possible to draw loose tissues, such as the abdominal wall, towards the point of the needle so that one commands an area of tissue nearly twice the length of the instrument. In this manner a large oblong tract should be blocked off so that retraction of flaps or dissection in the tissues at a reasonable distance from the incision may be possible without causing pain. My regular practice is to wait for five minutes before making the skin incision, thus allowing the anæsthetic sufficient time to permeate into the nerve endings. The deeper tissues are injected in much the same manner but it is not necessary to go quite so far afield from the incision as in the case of the subcutaneous injection. It is well to inject the deeper tissues along the line of the proposed skin incision and then complete the deep anæsthesia under direct vision, after going through the skin. In abdominal work a third injection must be made into the properitoneal tissue before cutting into this membrane as the parts in this region are extremely sensitive. If the operation entails work on bones an injection beneath the periosteum is necessary. Endoneural injection, as originally practised by Crile, is quite unnecessary and the recognition of this fact has assisted much in the development of regional or conductive anæsthesia. Plenty of anæsthetic in the immediate vicinity of the nerve supplying the part and sufficient time allowed for permeation will produce the desired result quite as effectually as the more delicate and difficult method of injecting the nerve directly. Thus the exposure of the nerve in question is rendered unnecessary and we may depend upon the usual anatomical landmarks and bony prominences to direct the needle into the immediate vicinity of the nerve.

The operation. It is quite possible to anæsthetize tissues against the necessary surgical insults, such as cutting, careful blunt dissection and suturing, but the rough use of retractors or otherwise pulling upon tissues or organs will always cause pain. Everything must be handled with the utmost care and gentleness and since the patient is not being subjected to the risks of a general anæsthetic, his interests are best considered when we take plenty of time to do the work well without causing him pain. All instruments should be in first class condition and everything of the cumbersome order eliminated. Picking up a bleeding point with a large hæmostat may cause intense pain whereas the same procedure with a neat slender pointed instrument would take care of the bleeder without involving a mass of the surrounding tissue with its bundles of small nerves. In abdominal work an accurate diagnosis, a liberal incision and a good working knowledge of anatomy are the prime requisites and given these together with a careful painstaking surgeon, there are few operations in this region that cannot be done under local anæsthesia. The abdominal viscera are quite insensitive except when traction is made upon the mesentery. Anything but very careful handling of the stomach and intestines will produce nausea so that exploration is much limited and this is one of the greatest disadvantages of the method for abdominal surgery. Even if our diagnosis is correct and we find a chronic appendix, it may mean much to the patient to ascertain the condition of his gall bladder and the possible presence of stones. Such a procedure under local would surely cause the patient considerable pain.

Field of application. If we include under the heading local anæsthesia, conductive anæsthesia, then there are few surgical operations in properly selected patients that cannot be accomplished in this manner. As early as 1891 Schleich reported two hundred and twenty-four operations performed under very dilute solutions of cocaine, the list including many laparotomies and Cushing[3] in 1900 reported forty-nine herniotomies out of a total of two hundred and thirty-three such operations performed within a two-year period at Johns Hopkins. The above two series taken at random from quite voluminous literature on the subject would indicate that even with cocaine, the method was popular and that a successful technique had been developed, but the dangers of the anæsthetic together with the additional toll taken out of the surgeon by way of inroads on his time and the difficulties of dealing with a conscious patient have had the effect of making local anæsthesia less popular. There have been good reasons for the lack of enthusiasm on the subject among surgeons but it would seem that the objections have been pretty well overridden, and I firmly believe that the interests of our patients would be better served by a more general use of the method. Patients are daily being subjected to the risks and disagreeable after-effects of a general anæsthetic for operations on hæmorrhoids, hernia, radical hydrocele and the excision of neoplasms who might just as readily be operated upon under local anæsthesia by the expenditure of a little more time and patience on the part of the surgeon.

References:

1. Hirschel.—"Text-book of Local Anæsthesia."
2. Braun.—"Local Anæsthesia."
3. Cushing—*Annals of Surgery*, vol. xxxi, 1900.

POST-GRADUATE LECTURE-DEMONSTRATIONS

Queen's University—Faculty of Medicine

It is proposed to hold throughout the Session a series of monthly lecture-demonstrations dealing with the scientific aspect of matters which are of practical interest to the medical man. These lectures will be held in the New Medical Building, on Mondays from 5 to 6 o'clock. The following is the series proposed for the current Session. A continuance of the lectures will depend to a certain extent upon the interest shown. The lectures will be illustrated by lantern slides, microscopic demonstrations and experiments. All medical men are cordially invited.

1. *The Pneumococcus*, its relationship to other bacteria, its types and the importance of these in the serum therapy of pneumonia. Lecturer— Professor James Miller. January 24th.
2. *Influenza*, its bacteriology, relationship of Pfeiffer's bacillus to the disease, prophylactic vaccination. February 21st
3. *The Ductless Glands and Organo-therapy with experiments.* Lecturer—Professor G. Spencer Melvin. March 21st.
4. *The present position of the Cancer Problem.* Lecturer—Professor James Miller. April 18th.
5. *Typhoid and Paratyphoid Fevers*, Bacteriology, serum diagnosis and vaccine prophylaxis. Lecturer—Professor James Miller. May 16th.

J. C. CONNELL, Dean.

Note.—A branch telephone is in course of installation in a room adjoining the lecture theatre.

NOTE ON SEASONAL HAY FEVER

W. Ness, M.D.

It is now an established fact that seasonal hay fever, as the term is generally understood by the medical profession, has for its cause a protein to which the individual is sensitive.

For this newly developed knowledge, we are chiefly indebted to the untiring efforts and delicate findings of L. Chandler Walker, and his associates, Wodehouse and Adkinson.. As a result of their investigations over five years, we are now able not only to find out the specific cause *in nearly every case* of seasonal hay fever, but we can satisfactorily prevent the condition, provided the proper treatment is administered, and at the proper time.

It is a fact that a very small percentage of seasonal hay fever cases are of bacterial origin, and, therefore, not due to protein sensitization; occasionally, however, a few of the bacterial cases may be sensitive to the protein in the bacteria.

Seasons and Causes. Since the term hay fever and its synonyms, as commonly used, are misleading and inaccurate, it is well to understand both the seasons and the causes of the different varieties.

During April and May, throughout the East, the various trees pollinate, namely, elm, maple, willow, walnut, oak, birch, as well as the dandelion, and only recently has it been demonstrated that tree pollen may cause seasonal hay fever.

The next season begins late in May and extends to the early part of July, during which time pollination occurs among the various grasses, including timothy, orchard-grass, red-top, daisy and June grass, and it is their pollens that cause seasonal hay fever at this time.

The third season begins about August 15th, and lasts until the frost. During this period the composite family of plants pollinate, namely, ragweed, golden rod, sunflower, daisy and corn, and give rise to the seasonal hay fever at this time.

Stated briefly, then, we have tree pollen hay fever,—later on grass, or hay pollen, hay fever,—and later still pollen hay fever from the compositæ family of plants.

The history, then, indicates the season, and by the skin test we can determine positively what particular pollen induce the symptoms.

Symptomatology. The symptoms of all three seasonal types are the same, i.e., there is a catarrh of the ocular conjunctivæ, and of the nasal and pharyngeal mucous membranes, beginning with a tickling and burning sensation, followed by marked sneezing, watering and itching of the eyes, running and itching of the nose. Associated with the attacks there may be marked depression and headache, and even general malaise. During the attack the mucous membrane of the nose and pharynx is highly irritable, so that dust, train smoke, strong odours and the like, aggravate the symptoms, whereas out of season the mucous membranes remain unaffected.

The duration of the attacks varies with the cause, and depends upon the pollination period. In the majority of cases the late type is found, i.e., from mid August until the frost.

Pollen Protein Sensitization. Sensitization may be either pre-natal or post-natal, and just why some individuals are sensitive, and some are not, is hitherto unexplained. Thus much we do know, however, that nearly every individual having seasonal hay fever, is sensitive to the protein in the pollen of some plant.

Multiple sensitization in seasonal hay fever is rather uncommon. Nevertheless, a small percentage of pollen hay fever patients are sensitive to two different botanical families, and consequently have hay fever throughout two distinct pollen seasons.

The age of onset of seasonal hay fever and its duration have no bearing upon the frequency, cause or treatment of the condition.

In Walker's series of 300 cases, or Cook's of over 600 cases, it was established that neither sex, occupation, or nationality seem to influence the cause, prevalence, or treatment.

Treatment. Other than specific protein treatment, there is none worth attempting, and by specific protein treatment, I mean desensitization against the particular protein causing the symptoms.

It is essential to successful treatment to find out just how sensitive the patient is. This is done by using various dilutions of the protein in conjunction with the skin test, then treating by injections with a dilution weaker than that to which the patient reacted to the skin test.

Positively. The skin test selects the proper pollen, and determines the degree of sensitivity, and thereby the proper strength solutions with which to start treatment.

Negatively. The skin test excludes those pollens to which the patient is not positive, and thus makes possible the avoidance of "mixed extracts" in treatment.

The ideal treatment in *seasonal hay fever* cases is pre-seasonal, for the same obvious reason that it is useless to vaccinate one against smallpox who already has smallpox; so, too, with respects to typhoid fever. Not so, however, in the case of diphtheria,—so when we say that the ideal treatment is pre-seasonal, there is still room for the statement that if a seasonal hay fever case presents himself during the season, he ought to be treated, but with the utmost care, and mindful of the individual idiosyncracies and requirements of the case.

Pre-Seasonal Treatment. The regular scale of dosage, as given below, is generally satisfactory. As a result of studied conclusions, the following table will be quite safe under ordinary conditions:

Solution 1–10,000		Solution 1–1,000	
1st injection......	0·1 c.c.	7th injection.....	0·2 c.c.
2nd injection......	0·2 c.c.	8th injection.....	0·3 c.c.
3rd injection......	0·3 c.c.	9th injection.....	0·4 c.c.
Solution 1–5,000		**Solution 1–500**	
4th injection......	0·2 c.c.	10th injection....	0·2 c.c.
5th injection......	0·3 c.c.	11th injection....	0·3 c.c.
6th injection......	0·4 c.c.	12th injection....	0.4 c.c.

Injections should be given not more often than every five to seven days. Treatment should be begun about twelve weeks ahead of the season, and after the above scale of dosage has been given, a few final treatments of solution 1–100 should be given.

Treatment during the season is open to question, for the obvious reason that the patient while receiving a known quantity by injection, acquires in addition an unknown quantity from nature. At all events, if the patient presents himself *during* the season, treatment, if attempted at all, must be carried out with a great deal of caution.

SUGGESTIONS TO CONTRIBUTORS

With a view to raising the character and value of our Journal throughout Canada, and rendering it of the most service to the profession, the Editors are of the opinion that careful consideration of the following suggestions by all our contributors will avail much. We, therefore, respectfully invite the attention of all our readers to the following points:

Do not attempt to make your article assume the proportions of a book. Space precludes such in the first instance, and readers do not expect to find an exhaustive treatise of any subject in a medical journal. Furthermore, such long articles take more time than can be conveniently given by the general reader. Avoid, therefore, verbosity. Many a good subject is spoiled by being so padded and swathed in words that the points of interest are obscured.

Long sentences and paragraphs are rarely necessary. They weaken the article, and do not reflect credit upon the writer.

Keep to the subject you are discussing. Too many quotations from authorities are seldom demanded, and are liable to confuse the reader, and take up much space. Bibliography, though worthy, is frequently overdone. The value of a paper is not estimated by a multiplicity of references, but by what you have to say, and how you say it.

Write concisely. Do not hesitate to condense as much as you can without interfering with clarity of expression.

Respect the amount of space in the Journal, and the cost of the printing page. Don't send in your manuscript until it is properly completed, viz., carefully typewritten (original copy), double spaced, corrected as to English and punctuation, and ready to be placed in the hands of the printer. There is no excuse for the author who finds it necessary to make many changes in the printed proof.

Illustrations are costly. Their value is obvious, but the expense entailed makes it necessary to include only such illustrations as are vital to the value of the paper.

Make use of the Editorial Board in your own province, and send all material through it. (See page iv.)

HYPERTHYROIDISM—PRESENT STATUS OF DIAGNOSIS AND TREATMENT

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OUR knowledge of those diseases of the thyroid which are associated with symptoms of hyperthyroidism has, within the last five years, been sharply revised. This has been due not so much to a more thorough understanding of the cellular pathology of the gland as to the accurate index of its functional activity afforded by the application of metabolic methods to the study of thyroid disease.

The normal thyroid is made up of acini and embryonic interstitial cells. The latter are of precisely similar origin to the cubical epithelial cells which line the acini, but represent the unused residue of the material available for the differentiation of the functioning element of the gland.

The function of the thyroid is concerned with the elaboration of a hormone essential to cell metabolism. These hormones determine the quantity of energy that any given cell in the body can produce by stimulation, from either within or without. By determining the basal metabolic rate—by which is meant the minimal heat production of an individual, measured after a fast of from twelve to eighteen hours and after the body has been at complete rest for at least twenty minutes—one can tell whether the hormone supply is above or below normal. In hyperthyroidism it is above normal.

Causes of hyperthyroidism. We have no definite knowledge of the causes of increased thyroid activity. That process of thought which invariably accepts as cause some event immediately preceding the effect regards the vagaries of the thyroid as the direct outcome of some physical or mental disturbance. It is a fact that a large number of cases of Graves' disease do develop immediately after some severe nervous shock or mental strain, and that there is often a definite history of an antecedent acute tonsillar infection, but there are many cases outside this category in which we are unable to offer even a conjecture as to the origin of the hyper-activity.

It is not definitely known whether the increase in the mitochondria content of the cells of the acini noted by Goetsch in hyperplastic goitre, discrete nodular adenoma, and diffuse adenomatosis, indicates functional or proliferative hyperactivity.

Value of basal metabolic methods in hyperthyroidism. In hyperthyroidism, basal metabolic methods are of great value clinically in the following ways:

(1) In determining the degree of toxicity in cases of toxic goitre. (2) In determining the operative risk judged by the degree of toxicity. (3) In determining whether in a given case of toxic goitre, especially the exophthalmic type, the individual is approaching or receding from a crisis—information of great importance where an operation is under consideration. (4) In determining whether, in cases of large goitre with symptoms resembling hyperthyroidism, these symptoms are due to hyperthyroidism or not. (5) In differentiating, in the presence of goitre, between tachycardia of nervous origin and that due to increased thyroid activity. (6) In discovering the effects of operation, *x*-ray treatment, the administration of thyroxin, or other modes of therapy.

Classification of thyroid disease associated with symptoms of hyperthyroidism. Diseases of the thyroid associated with symptoms of hyperthyroidism may be divided into two main groups: (1) those associated with hyperplasia of the embryonic interstitial rest cells; and (2) those in which the glandular acini show variations from the normal. We will first consider Group 1.

Hyperplasia of the embryonic interstitial rest cells gives rise to two conditions: (1) Discrete nodular adenoma; and (2) Diffuse adenomatosis.

Discrete nodular adenoma—toxic adenoma—results from focal proliferation of the interstitial rest cells. As the nodules grow, definite acini are formed, which, after passing through progressive stages, may come to resemble very closely those seen in exophthalmic goitre, in which the walls are infolded and the epithelium columnar. The disease, in 50 per cent. of the cases, is bilateral. The goitre appears at an earlier age than in Graves' disease, but the age at which symptoms of hyperthyroidism develop is, on an average, ten years later, from fifteen to eighteen years elasping between the appearance of the goitre and the development of toxic symptoms. The symptoms develop slowly and have usually been in progress two or three years before the patient seeks surgical treatment. The toxic period, therefore, generally occurs in middle life, between the ages of forty and forty-seven. The increase in the basal metabolic rates seldom exceeds plus 35. Vascular hypertension is present. Eventually all of the symptoms of Graves' disease may be well defined except exophthalmos. Even in this type, if, in addition to adenoma, areas of glandular hyperplasia are also present, the staring eye, as distinguished from the protuberant eye, is occasionally noted.

In diffuse adenomatosis—the type described by Goetsch—one has to deal with a bilateral diffuse adenomatosis, originating in the embryonic interstitial cells. In these adenomata, which are numerous and small, the acini are less perfectly developed than in the discrete nodular type. An attempt to differentiate this group has led to a great deal of controversy, which is not yet ended. The symptomatology may be outlined as follows: Moderate evening temperature, 99½; pulse labile and accelerated; underweight, with inability to gain weight; tremour; cold hands; mental disturbances, fits of crying, etc. Goetsch states that the adrenalin test is invariably positive. The basal metabolic rate is normal. Sometimes an incipient lung lesion is also present, which may for a time be misleading, but not ultimately, for, while the lung condition and attendant symptoms may after a period of rest show distinct improvement, the fever, tachycardia, tremour and weakness recur as soon as the individual begins to take exercise again.

If we now turn to Group II, which deals with variations from the normal in the glandular acini, we will find that it also may be subdivided into two parts: (1) the hyperplasia of puberty; and (2) Graves' disease or exophthalmic goitre.

In the hyperplasia of puberty the acini, which are normally circular in outline and lined with cubical epithelium, show a slight irregularity in contour and an increase in size, and there is a tendency in the lining cells to assume the columnar type. In an individual whose thyroid shows this type of disease, the basal metabolic rate is slightly increased.

In Graves' disease or exophthalmic goitre, the acini are enlarged and irregular in contour, and the epithelium is infolded and definitely columnar in type. The basal metabolic rate shows an average increase of plus 50, and in individual cases may be as high as plus 100. The goitre appears generally between the ages of twenty-eight and thirty-eight, and symptoms of hyperthyroidism are noted within from three to nine months after the development of the goitre. The symptoms progress rapidly. Exophthalmos is well defined, in half of the cases, within three months of the onset of symptoms. The glandular hyperplasia is bilateral in 90 per cent. of the cases. Surgical aid is sought, on an average, ten years earlier than in toxic adenoma. The individual may present all the cardinal signs and symptoms of this well-known disease, viz: palpitation, rapid pulse, exophthalmos, increased appetite, nervousness, tremour, loss of weight, loss of strength, fever, heat intolerance, vomiting, diarrhœa, and, in the later stages of the disease, myocardial changes, leading finally to auricular fibrillation and general œdema. Vascular hypertension is conspicuous by its absence.

Treatment of Hyperthyroidism

Medication. To use the well-known expression of the late Professor James Stewart: "There is no known remedy which has any particular effect upon the course of the disease." That is not to say, however, that in hyperthyroidism the administration of thryoid preparations may not be distinctly harmful. In this connection it is interesting to note that experimental observations are being made upon the effects of the administration of thyroxin—the active constituent of the thyroid gland, which has been isolated by Kendall. On the assumption that hyperactivity in the thyroid gland is a response to some form of systemic demand, it is thought that the administration of thyroxin may allay this demand and thus lead to a slowing down of the glandular process. The effects can be noted with almost mathematical precision by studying the basal metabolic rate. Thus, the administration of one-third mgm. of thyroxin will increase the basal metabolic rate of an individual weighing 150 pounds by one per cent. It has been shown that in a case of myxœdema with a metabolic rate of minus 30, the administration of 10 mgm.

of thyroxin will restore the basal metabolic rate to normal. The rapidity of exhaustion of thyroxin, the amount consumed daily, the glandular content and the body content, may all be established by metabolic determinations. These experiments revive memories of past methods of medication, which favoured the administration of thyroid extract and iodine products in the treatment of hyperthyroidism, with results that in some cases were said to be encouraging and even curative.

Refrigeration. Whether the belief was well founded or not, Professor Kocher laid great stress upon refrigeration. "Back to the hills and the open" was his oft-repeated order to those whom he did not consider safe operative risks. The local application of ice to the gland and præcordia gives, for obvious reasons, a certain measure of relief. Crile's advocacy of ice packs in the severe forms of hyperthyroidism with fever is accepted as rational, and is being more extensively practised.

Rest. The most important of the therapeutic measures is rest. Rest in bed with the administration of sedatives during a crisis and proper dietetic measures will cure some of the most forbidding cases of Graves' disease. To secure results, however, the rest treatment must be prolonged, and for this reason it is seldom accepted where a surgical operation offers a hope of earlier and permanent restoration to normal health and activity.

X-ray treatment. We have no reliable data upon which to found the belief that *x*-ray treatment of hyperthyroidism is either curative or palliative. Improvement in symptoms or even a complete cessation of symptoms, within from three to six months after a course of exposures, cannot with certainty be ascribed to the effects of the *x*-rays. Spontaneous recoveries and normal remissions may account for many of the reported cures. Metabolic observations may throw light upon this question. One may, however, state with assurance that the scarring induced by the use of the *x*-rays renders subsequent operative treatment more difficult.

Cauterization and injection with boiling water. Partial destruction of the exposed gland by the actual cautery or the production of necrosis by injections of boiling water are two methods of treatment with which I have had no personal experience. The former would appear to carry as great a risk as ligation or partial lobectomy, while the latter is an uncontrolled procedure and is unlikely to become widely practised. It is, moreover, not without its attendant death rate.

Operation. It is important to recognize the fact that operation is not essential to the cure of hyperthyroidism, nor does cure invariably follow operation, although a better understanding of the disease and earlier reference to the surgeon is leading to an increased percentage of operative cures in both Graves' diseases and toxic adenoma. The indications for operative treatment in Graves' disease and toxic adenoma have become more clearly defined. In toxic adenoma the basal metabolic rate seldom exceeds plus 30 or 35. Excision of the nodule or nodules gives almost immediate relief from symptoms, and in 85 per cent. of cases leads to a permanent cure. The basal metabolic rate will be found to drop from plus 30 or 35 to plus 8 or 10 within three weeks of operation.

It has long been recognized by surgeons that certain cases of hyperthyroidism were cured in a phenomenally short space of time after lobectomy, while others, apparently of the same type and degree of intoxication, showed little or no improvement after operation. Many of these cases belonged to the group of discrete nodular adenoma, and the failures are to be ascribed either to the removal of the wrong lobe in cases of solitary adenoma, or to the fact that the surgeon did not observe that the disease was bilateral. For this reason complete exposure and direct palpation of the whole gland should be carried out.

In Graves' disease the surgeon is confronted with a most serious medical as well as surgical problem. It is in this group that the estimation of the basal metabolic rate is of greatest assistance—not, however, that it can be said that all cases below a certain rate are operable and all above it inoperable, for such is not the case. For example, polar ligation or thyroidectomy may be undertaken with less risk in an individual returning, so to speak, from an attack than in one entering upon an attack or crisis, even if in the former case the basal metabolic rate is much higher than in the latter. Repeated estimations are a guide as to which direction the patient is taking, whether toward a crisis or toward a recession. Generally speaking, the metabolic rate and the pulse rate show a definite parallelism, but, while the pulse rate is susceptible to individual variations and reacts to various stimuli, mental, ocular, auditory, and cutaneous, not to mention the irregularities which may be due to myocardial changes, the metabolic rate remains unaffected so long as observations are made under the conditions before described.

The symptoms which portend a grave operative prognosis are (1) a high basal metabolic rate; (2) rapid loss of weight; (3) rapid loss of strength, of which loss of power in the quadriceps and inability to "step up" are valuable indices; (4) rapid pulse, œdema, auricular fibrillation; (5) vomiting and diarrhœa; (6) heat intolerance; and (7) fever.

It is important that patients upon whom operation is contemplated should be under observation for at least a week. Operation without preliminary rest and adequate investigation is responsible for a large percentage of the operative deaths. If there is one disease in which hurry-up remedies should be discountenanced, it is surely Graves' disease. An intimate clinical knowledge of a given case can be acquired only by observations which include, as a routine and apart from general physical examination, an examination of the blood, clinical and bio-chemical; electrocardiographic readings; *x*-rays of the upper thorax; and repeated determinations of the basal metabolic rate. Nor is it to be assumed that, because after a week's rest in bed all symptoms improve and the pulse rate falls from 120 to 90 or even 80, radical thyroidectomy may be undertaken without risk. It is the experience of those who have treated the greatest number of cases, under the most favourable conditions, that even such comparatively simple procedures as single ligation under local anæsthesia, or the injection of one lobe with boiling water, have an attendant death rate. It is also the experience of these men that in many cases a complete cure can be effected only by repeated operations; for example, a single ligation to begin with; at the end of three or four weeks a second ligation; and after the lapse of a further period of weeks or months a partial or complete thyroidectomy. We have come to realize that in Graves' disease, as also in toxic adenoma, a lobectomy is not the punishment which fits the crime. In a large percentage of cases, permanent cure is to be secured only by an operation in which approximately four-fifths of both lobes, together with the isthmus is removed. After this type of operation the basal metabolic rate will in the average case drop rapidly from plus 50 to plus 20 or 15, the average pulse rate from 115 to 90 or 85. The immediate relief of the more distressing subjective symptoms, especially heart thumping, is a striking feature. Complete cures follow in about 65 per cent. of the cases; in an additional 15 per cent. there is a marked improvement. Many of the cases classified as improved are cured of hyerthyroidism, but not of the myocarditis to which the residual symptoms are referable.

In considering the death rate from operation in Graves' disease, one must not lose sight of the fact that there is a mortality in unoperated cases. There are no reliable data upon the death rate in these cases, and it is therefore impossible to state in figures how much surgery has contributed to the reduction of the mortality of all cases.

Rest is an important adjuvant in the surgical treatment of Graves' disease—rest both before and after operation. After operation the best results are obtained where a period of three months' rest is rigidly maintained. In fact one might go so far as to say that, unless these patients are prepared to devote this period of time to their convalescence, many of them will, at the end of six months or more, be found to be still suffering from hyperthyroidism.

One may well ask how it is that a radical surgical procedure should be so slow in yielding results. The probable explanation is that the symptoms of hyperthyroidism in exophthalmic goitre are not wholly due to increased activity of the thyroid gland, but that the gland only bears the brunt of a disease which involves simultaneously other glandular as well as nervous elements concerned in maintaining the balance of the internal secretions.

Each case must be treated on its merits as to time and type of operation. Primary thyroidectomy is the operation of choice, and is done in all cases of toxic adenoma, unless there is myocardial disintegration with œdema. Preliminary ligation, unilateral or bilateral, is indicated in about half of the exophthalmic cases. A high basal metabolic rate, rapid loss of weight and strength, vomiting and diarrhœa, preclude anything more than polar ligation. Loss of weight is of particular importance as an index of the degree of intoxication as well as of the duration of a particular attack. Generally speaking, no operation should be undertaken during a crisis. However limited the surgical procedure, it is invariably followed immediately by a rise in the basal metabolic rate. The possible extent of this rise, with the accompanying exacerbation of all symptoms, must be estimated as far as possible and deducted from the margin of safety.

I would say again that it is only by close observation in each case that one may hope to acquire and display a rational judgment as to when operation should be undertaken and what type of operation is suitable to the particular case. If during the course of an operation the pulse rate should rise rapidly, the wound should be packed and the operation completed at a later date. A delayed primary suture of the wound may be indicated, if for any reason the operation has been prolonged.

An excessive rise of temperature, with acute exacerbation of all symptoms after operation, is best treated by ice packs or colds baths.

The choice of the anæsthetic must rest with the surgeon. Local anæsthesia, nitrous-oxide-oxygen, ether, or a combination of either nitrous-oxide-oxygen or ether with local infiltration, offer a fairly wide choice. Local anæsthesia should be used for preliminary ligations; in all cases where there is pressure on the trachea; in all cases of intra-thoracic goitre; where bronchitis is present as a complication; or where there are myocardial changes.

Because of the better classification of cases of hyperthyroidism and the new methods available for estimating the degree of intoxication, statistics upon the curative results of operation will show progressive improvement. Much can be done to eliminate risks, hasten convalescence, and increase the percentage of cures, by close co-operation between the internist and the surgeon and the submission of cases to operation before irreparable myocardial changes have developed.

On Nurses and Nursing.—In view of the shortage of nurses, certain provisions for nursing service require attention. The mere possession of wealth should not be sufficient reason for a single patient having three or four trained nurses in attendance, while other persons less blessed with large incomes are deprived of the service of a single nurse. Senile persons and those afflicted with chronic but harmless ailments should have no particular claim upon a trained nurse's service while victims of acute disease are suffering for the want of necessary nursing attention. In a large proportion of the diseases of childhood nursing service does not require a highly trained nurse, but the wants of the youngster may be thoroughly satisfied by the attentions of an intelligent mother or some type of trained attendant.

Physicians are vitally interested in nursing problems, and possess a peculiar responsibility with reference to their training and to the development of the types of nurses which are in demand for the different phases of public service. It is particularly necessary to realize, as is pointed out by J. B. Howland, *Boston Medical nad Surgical Journal*, November 25, 1920, that the better trained nurses are not likely to be available to the same extent as formerly for private duty with sufferers from chronic diseases and the temporary victims of minor illnesses, but the necessary care in these instances can properly be given by trained attendants. It is a waste of education to utilize highly trained nurses for such minor duties as are required in the average doctor's office, in the management of most chronic diseases, as laboratory assistants, as telephone operators, or even as anæsthetists. Some readjustment in education is required in order that courses may be provided that will supply a basic, general training common to all forms of nursing, to which may be added a variety of special forms of training leading to the development of capability and some special useful ability. In fact, our training schools for nurses now are obliged to consider the public needs in contemplating a nurse's curriculum. They can no longer follow a traditional form of training mainly designed for caring for hospital patients or for private duty. Less technical knowledge is not opposed to effective nursing service. Furthermore, hospital training schools, as pointed out by Howland, must offer really educational courses with well planned lectures by paid and capable instructors. *American Medicine*, December, 1920.

Editorial

VITAMINES OR ACCESSORY FOOD FACTORS

THE discovery, that there are other nutrients necessary to a normal diet than proteins, fats, carbohydrates and salts, is the result of the researches of the last fifteen years, initiated by Professor F. Gowland Hopkins of Cambridge, who found that young animals would not grow or live on a diet made up of the purified proteins, fats, carbohydrates and salts extracted from milk, although animals similarly fed would thrive if a trace of milk or egg yolk were added to such diet. Professor Hopkins' results led him to conclude that not only in growth but also in the condition of well-being there are obscure factors involved the absence of which in diets account for such diseases as rickets and scurvy. His observations which were published in 1906 excited interest and stimulated the researches, almost wholly amongst British and American biochemists during the last eight years, the results of which have thrown a flood of light on the causation of a number of diseases of nutrition such as rickets, osteomalacia, marasmus, beri-beri or polyneuritis, scurvy and pellagra.

It has been established as the result of researches of the last eight years, that all of these diseases, except the last named are each due to the absence of one factor and that at least three such factors must be present almost constantly in a diet if the human subject is to escape all these diseases. Voegtlin claims as a result of his observations on pellagra that the absence of all three from the diet of a certain portion of the white population of the Southern States during the winter months leads to the development of this disease in the spring when its incidence is greatest.

These factors, provisionally grouped as Vitamines or Accessory Food Factors, may, for convenience, be termed the anti-rachitic, the anti-neuritic and the anti-scorbutic. They are, it is held, formed only in the vegetable kingdom and from the vegetable constituents of the diet animal tissues ultimately derive their supply of them which may be stored up in fat, muscle, liver, and egg yolk and secreted in milk or excreted in urine.

The anti-rachitic vitamine which occurs in butter, milk, cream, cheese, animal fat (but not in lard or vegetable oils), cod-liver oil, egg-yolk, spinach and lettuce promotes normal growth and nutrition. It is more commonly known as the "Fat Soluble A" Factor, because it is commonly found dissolved in or associated with fat and it is probably of lipoid character. Its absence from a diet, if continued for a prolonged period, causes rickets and marasmus in growing or young subjects and an imperfect or deficient calcification of the osseous tissues or osteomalacia in adults. Its absence from a diet also gives rise to xerophthalmia, an inflammatory condition of the conjunctiva and eyelids leading, if unchecked, to blindness, a disease not unknown as a result of pronounced rickets but which in animals can be cured in a few days by the addition to their food of cod-liver oil, butter, milk or cream. It was the lack of this vitamine that caused the extraordinary prevalence of rickets, marasmus and osteomalacia in the 30,000 children of Vienna during and immediately following the war.

The anti-neuritic vitamine occurs in all green vegetables and especially in the pericarp of the rice grain. It is soluble in water and hence is called the "Water Soluble B" Factor. When polished rice is the sole article of diet beri-beri, a polyneuritic affection fundamentally, develops and proceeds so far as to terminate fatally, but animals affected, even when moribund, are cured in a few hours by the injection of a concentrated extract of rice polishings.

The anti-scorbutic factor obtains in all green vegetables, raw potatoes and fruits, but is destroyed when these are heated or dried. It occurs also in yeast and fresh meat (not in "tinned", salted, or cured.)

The attempts to separate these vitamines individually each in a pure form have not, so far, met with much success. They occur in food stuffs in such minute amounts that enormous quantities of the raw material containing them have to be subjected to extraction to furnish even traces of them. Their chemical characters are therefore, almost wholly unknown. They break down or are decomposed on purification. The anti-neuritic vitamine, as it is concentrated, decomposes, loses its property of curing polyneuritis in animals, and yields products, one of which is nicotinic acid, a point that may be of interest to the lovers of "the weed."

Heat, up to 100°C, if prolonged gradually affects the anti-rachitic and anti-neuritic vitamines while it at once destroys the anti-scorbutic element. Milk, which contains all the vitamines, may accordingly be pasteurized without wholly destroying the anti-rachitic and the anti-neuritic factors, while if the anti-scorbutic one is broken down the loss may be made good through the addition of a small quantity of fresh orange juice.

It is possible that what is already achieved in the researches on the vitamines is only the beginning of a knowledge of the subject which in years to come may play a very great part in the treatment of diseases of nutrition. The enthusiasm of a host of biochemists eagerly working in this field is indicative of the importance they attribute to these food factors. It is also possible that if they are isolated each in a pure form and their constitution carefully determined, their synthesis in the laboratory may not be a far-off event!

THE VALUE OF AN ESTIMATION OF THE UREA CONTENT OF THE BLOOD

ATTENTION is directed to the article appearing in this issue upon the Study of the Chemistry of the Blood in its relation to acute abdominal conditions. Even at the risk of being charged with unnecessary reiteration in these columns we feel that the subject of the "Acute Abdomen" is of such importance as to warrant almost continuous consideration.

It is true that the article does not pretend to be more than a preliminary report from which definite conclusions should not be drawn; and moreover it deals with the prognostic rather than with the diagnostic or therapeutic aspects of disease which perhaps is not of such immediate practical value. Nevertheless it marks the advent of original work in the field of clinical surgery and as such demands attention and suggests similar investigations in the hospitals throughout the country, to the end that good may accrue.

Nor are these investigations necessarily confined to hospital laboratories. We are informed that the tests take but a modicum of time with apparatus costing but ten dollars.

At the Montreal General Hospital, from the laboratory of which the article emanates, the experience has been that not only are the blood findings of prognostic importance, but in a few obscure cases of incomplete intestinal obstruction have already proven of diagnostic value and have determined prompt operative interference with satisfactory results.

When interpreting the term "Acute Abdomen", we are accustomed to regard the term as implying a condition of general peritoneal involvement resulting from a local lesion and threatening life; examples are appendicitis and perforations of the hollow viscera. The difficulty in making an accurate diagnosis lies chiefly in determining the locus of the original lesion; operative treatment is usually indicated and the lesion is dealt with wherever found. It would indeed be a foolhardy procedure to dally with an extending peritonitis in order to more definitely diagnose the original focus.

But of only slightly less importance are those cases which may be designated as the "Subacute Abdomen", in which no real peritonitis is present but in which there is marked distention, and the patient is too ill to undergo a prolonged routine examination. Examples are Richter's or internal herniæ with incomplete obstruction.

If, in such cases, with effectual or partially effectual bowel evacuation, a rising blood urea proves to be an indication for operative interference in spite of a temporary improvement in clinical appearance this application of blood chemistry will have a life saving value.

The Association

THE HALIFAX MEETING

ARRANGEMENTS for the 1921 annual meeting of the Canadian Medical Association at Halifax are well under way. The following is the General Committee:

Dr. Murdock Chisholm, *President.*

Dr. S. L. Walker, *Chairman.*

Dr. W. L. Muir, *Secretary.*

Dr. H. K. MacDonald, President Nova Scotia Medical Society.

Dr. J. G. MacDougall, President Halifax Medical Society.

Drs. A. I. Mader, J. R. Corston, A. G. Nicholls, E. V. Hogan, G. R. Murphy and G. A. MacIntosh.

Chairmen have been appointed for Committees on programme, papers, entertainment, printing, lodging, exhibits, finances, etc. These several Chairmen have selected others to work with them, and already substantial progress has been made.

The general meetings will all be held in the Library of Dalhousie University, a room admirably suited for the purpose, being sufficiently spacious and having very good acoustic properties. Meetings of Sections, registration and business offices, and exhibits, will use very suitable rooms in the main University building. The University is easily reached by electric cars, and motors will be available at all times. The situation on the North West Arm is an ideal one for a summer convention.

The programme is already taking shape. Sir G. Lenthal Cheatle of London will give the address in Surgery, and Dr. D. L. Richardson of Providence that in Medicine. Papers have been promised by Drs. Chipman, Archibald and Garrow of Montreal; Dr. Risdon of Toronto, and Dr. MacAusland of Boston. Dr. W. J. Mayo has written stating the hope that either he or his brother would be present, but in any case a member of their Clinic will attend. The Committee is in correspondence with other prominent doctors in Canada and the United States. Readers of the JOURNAL who desire to add to the success of the gathering by thier contributions should advise the Committee as soon as possible.

The principal Hotels in Halifax are the Halifax, Queen, Carleton, King Edward, King George, and they believe they can easily provide the necessary accommodation. The Lodging Committee has assured the General Committee that every one will be comfortably and reasonably housed.

Already some applications for space in the exhibit hall have been received, and as the place is admirably adapted for this purpose, a good exhibit is expected.

The Entertainment Committee believe they will be able to make every visitor realize that Halifax is a city of splendid hospitality. Probably next month an outline of the Entertainment programme can be given.

The General Committee is now so sure of their work that they feel that success of the meeting of 1921 depends upon the number of members attending from Quebec, Ontario and the West. The Maritime Province men will attend in large numbers.

Anyone desiring information or willing to contribute to the programme should write to the Chairman of the Programme Committee, Dr. A. I. Mader, 57 Morris St., or the Chairman of the General Committee, Dr. S. L. Walker, 14 Carleton St., or the Secretary of the Committee, Dr. W. L. Muir, 245 Robie St.

HOTELS

Halifax Hotel.

American Plan only, $5.00 to $6.00; $5.00 without bath and $6.00 with bath.

Queen Hotel.

American Plan only, rooms $4.50 to $5.50. $4.50 without runing water, $5.00 with running water, $5.50 with bath.

Carleton Hotel.

American Plan only, $4.00 to $5.50. $4.00 without bath. $4.50 with running water, and $5.50 with bath.

Correspondence

INCOME TAX RETURNS

To the Editor,—

I HAVE to acknowledge receipt of your letter of the 21st inst., and note your Association are undertaking the production of a medical journal and would like to give publicity therein to the manner in which members of the medical profession shall keep their records with a view to making proper income tax returns.

I feel that something of the nature which you suggest will be of mutual benefit, not only to the medical profession but to other professional men, as well as to this department.

For your information I may say the following is a general outline of the basis on which doctors, lawyers, or other professional men are taxed under the Income War Tax Act, 1917:

1. Accounts receivable or accounts rendered, together with cash received as shown by the Cash Book, shall form the basis on which a tax shall be made. The income thus shown, whether actually received in cash or not, shall be taxable income.
2. That cash received within a taxation period, otherwise than in respect of accounts rendered which have already been used as a basis of return, shall be considered as taxable income for the period in which received.
3. Cash received on account before an account is rendered, and which has already been treated as taxable income, shall be deducted from accounts receivable in calculating the income in respect of such an account.

The three preceding numbered paragraphs are in respect solely to income from professional income, and have no bearing on "other income" which will be included in the return in the usual manner.

For Income Tax purposes net income means gross income less the deductions and exemptions allowed by the Act. In all cases gross income must be shown and full data given of any deductions claimed. Subject to the taxpayer's right of appeal, the officials administering the Act are the judges of what are proper deductions from gross income in accordance with the Act, and the taxpayer will not be excused from liability for the omission of items of gross income on the ground that he believed them exempt from taxation or proper deductions from income. Under gross income must be recorded every item of income derived from any source whatever actually received or accruing (see paragraph 1 above) during the calendar year for which the return is rendered, whether received in cash or the equivalent of cash.

I have no doubt from the above you will obtain what you desire, but should you wish it enlarged upon I shall be glad to reply to your further representations.

I might add that where a doctor or professional person is in doubt on any point regarding the filling of his Income Tax Return, he should apply to the Inspector of Taxation in charge of the Taxation District in which he resides. These inspectors are at all times willing to furnish any information or assistance, free of charge, to any taxpayer upon application.

Yours faithfully,

P. W. BRADEUR,
Commissioner of Taxation

THE ADMINISTRATION OF ARSENICAL PREPARATIONS FOR THE TREATMENT OF SYPHILIS

To the Editor,—

THE following suggestions may be of some value to your readers in general practice:

In the administration of phenarsenamine (the Provincial Board of Health "606" preparation), or other arsenical preparations for the treatment of syphilis, the following points should be carefully considered:

A. Before Treatment:

1. Minor acute illnesses (such as colds, bronchitis, etc.) should be considered temporary contra-indications to intravenous treatment. It should be remembered that, occasionally, under

arsenical treatment, chronic skin diseases may become acute.

2. A fat person does not, as a rule, tolerate the drug so well as a spare muscular person.

3. Before anti-syphilitic treatment is begun a urinalysis should be made.*

4. The night before the administration of the drug a laxative should be given.

5. Solid food should not be taken by the patient for at least six hours before treatment.

6. The initial does should not be more than 0·3 grams in men or 0·2 grams in women.

B. Treatment:

1. "606" preparations are more stable than "914" ones.

2. The treatment should be given with the patient in a recumbent position with the head slightly raised on a pillow.

3. With 606 or phenarsenamine the solution should never be given more concentrated than 0·1 grams to 20 c.c. of freshly distilled water.

With neo preparations a concentrated solution 0·1 grams of the drug to 3 c.c. freshly distilled water may be used, provided it is given very slowly at a rate not exceeding 0·6 grams in two minutes. More dilute solutions given by the gravity method are less likely to cause reactions than concentrated solutions, particularly if the latter are rapidly administered.

4. The drug should be administered immediately it is prepared.

5. The strictest asepsis should be observed.

C. After Treatment:

1. After administration the patient should be kept quiet (preferably recumbent) and under observation for at least half an hour. A hypodermic solution of adrenalin chloride should always be readily available for injection at the first sign of any reaction.

2. No solid food should be taken by the patient for at least four hours after treatment.

3. If signs of dermatitis or jaundice appear treatment should be discontinued.

Mercury should be given as part of the treatment. Intramuscular injections or inunctions appear to be the best method of administration.

Yours truly,

John W. S. McCullough,
Chief Officer of Health for Ontario

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* An acute kidney lesion should be considered a contra indication to the use of arsenical preparations.

Retrospect

THE DETERMINATION OF BASAL METABOLISM BY ESTIMATION OF THE RESPIRATORY EXCHANGE (INDIRECT CALORIMETRY) AS A CLINICAL METHOD IN THE DIAGNOSIS AND TREATMENT OF HYPER-THYROID AND HYPOTHYROID STATES

Maude E. Abbott, M.D.

THE "basal metabolic rate" of the individual is to be defined as the numerical expression of his minimal heat production during the post-absorptive or fasting and resting state (*i.e.*, twelve to eighteen hours after the ingestion of food, and with the organism at complete muscular rest), either by direct observation of the heat elimination made in a respiration chamber, (*direct* calorimetry), or by the calculation of the heat production based on the amount of oxygen absorbed and the carbon dioxide expired (*indirect* calorimetry), or by both methods combined.

In earlier studies in this field calorific values were expressed as such; the establishment of normal values for age, sex, and surface area have made it possible to state these in terms of percentage of the individual, which is a convenient form and is what is meant by "basal metabolic rate".

Direct calorimetry is a complicated and costly procedure, inapplicable to routine clinical use. But the researches done by its means have made possible the practical application of the indirect method. Indirect or respiratory calorimetry, with which we are here directly concerned, has on the other hand a relatively simple technique, and the determination of basal metabolism, or minimal heat production, by one or the other of its methods has come into prominence within the last five years as a clinical procedure, of wide application, which is of especial value in diagnosing and guiding the therapy of many obscure pathological states, chief among which are disorders of the internal secretions, especially of the thyroid gland. The present status of this subject, which has just passed from the realm of scientific knowledge to that of practical clinical application, is a brilliant example of that effectual concerted action by which modern science has achieved its greatest results. Through the labours of many workers, first among whom should be mentioned Krogh, Haldane, Benedict, Carpenter and Lusk, and by the active correlation of the results of all, an extremely difficult process, involving complicated apparatus and an extensive series of calculations, has been reduced to terms of the greatest simplicity, and to a procedure, the application of which must be considered quite as rational and even as essential as is the Wassermann test in syphilis, or the use of the thermometer in febrile states. Indeed, the fluctuations of heat production or basal metabolism bear a close analogy to the range of the body temperature in health and disease.

The study of calorific values was initiated on this continent in 1904 by Atwater, from Voit's laboratory, by means of the Atwater-Rosa calorimeter. This was replaced in 1905 by the greatly improved Atwater-Benedict chamber, which was installed in the Carnegie Institute laboratory (erected to receive it) at Boston under the charge of Prof. F. G. Benedict, and was used by him for extensive researches into the standardization of apparatus in the resting, fasting, and diabetic states. In 1912 Graham Lusk installed a small calorimeter for animals and infants at Cornell, and in a series of studies on animal calorimetry (published in the *Journal of Biological Chemistry* from 1912 on) cleared up other fundamental problems and led the way to further researches. The next step was the establishment, at the Russell Sage Institute, of the large respiration calorimeter with combined system for the simultaneous determinations of the respiratory exchange by the closed-circuit method of indirect calorimetry, the so-called universal apparatus of Benedict, which was constructed by him in 1912 with the object of such an attachment in view and with the intention of bringing this complicated procedure closer to the needs and capacity of the clinic. Then followed that remarkable series of studies by DuBois and his associates entitled, "Clinical Calorimetry", (published in the *Archives of Internal Medicine* from 1915 on), by which normal values were established, a height-weight curve for the estimation of surface-area supplied, and the extremely important point of the close agreement between the results obtained by the methods of indirect. and direct calorimetry definitely proved.

The various forms of respiratory apparatus in use up to the year 1915 were described by Carpenter in an exhaustive comparative study published by the Carnegie Institute (I. 3). He corroborated the close agreement between direct and indirect calorimetry demonstrated by DuBois, and differentiated two types of apparatus for the estimation of respiratory exchange: (a) the so-called closed circuit method, of which the Benedict Universal apparatus is the best example. In this, the subject breathes directly into an apparatus in which the carbon dioxide given off is separated by a chemical process and the oxygen consumed replaced, and the amount of each determined by weight, and used for the basis of calculations. This method, used by Professor Benedict in his "Universal "apparatus, devised especially for the purpose of combined studies with the respiration chamber and for independent clinical work, was repeatedly improved (I. 4) by him to a point of great perfection so far as the limitations of a method by weight alone admit; the new "Benedict Portable" is a modification of it for rapid estimation of the basal metabolism by oxygen consumption. (b) The gasometer or open-circuit method, ("Modified Tissot") in which the patient is connected by tubes provided with face-mask and respiratory valves with a spirometer tank or other closed chamber, in which the expired air is collected and from which samples are later withdrawn and their content determined by the Haldane gas-analysis apparatus.

The field of indirect calorimetry *per se* was first entered by J. H. Means working at the Massachusetts General Hospital (service of Professor Edsall) with the Benedict Universal apparatus, and shortly thereafter by Walter M. Boothby, who introduced the modified Tissot at the Peter Bent Brigham Hospital of Boston (service of Dr. Harvey Cushing). Both these laboratories were operated in close communication with the researches by direct calorimetry proceeding at the Carnegie Nutrition and Russell Sage Institutes; and standardization of apparatus and accumulation of data on thyroid, pituitary, and cardiac cases, with records of effects of drugs, thyroid medication and other treatment, went forward rapidly. The removal of Dr. Boothby and Miss Irene Sandiford to the Mayo Clinic in 1917 in Dr. Plummer's service, gave an immense impetus to the Tissot work by supplying to them a field of wide scope and rich material. Since then in their hands the gasometer method has been further reduced, by the utilization of manual labour under systematic checking of results and other means, to a process of real simplicity and of very rapid application, as is evident from their record of over ten thousand observations made in their laboratory in the last four years!

The final steps in the evolution of these two methods of clinical calorimetry have been taken, (a) in the unit system by the construction by Benedict in the year 1918 of his small portable apparatus for the rapid bedside determination of basal metabolism by oxygen consumption without weighing or analyzing; and (b) in the gasometer system, by the publication by Boothby and Sandiford of their manual on the basal metabolic rate, (Saunders, 1920), in which the entire detail of their modified Tissot technique, with abridged calculations and facsimiles of charts, is set forth, with a clearness that renders its application easy and practicable for any hospital or office where a gas analyst can be trained. The book contains all the information necessary for a thorough understanding of the subject, including a description of the two other apparatuses recommended for clinical work, the Benedict Universal or Unit and the new Benedict Portable. The authors state that they have selected the Tissot for their own observations and recommended it in preference to the unit system because of its broader application and the more exact nature of the data obtained by the gas analysis required; they consider this gas-analysis an asset rather than a drawback, as opening the door to a wider field of investigation of the respiratory exchange, and claim that the loss of time in it, is offset, in the Benedict, by the time expended in the care of this apparatus, which must be tested daily for leaks; these represent a loss of oxygen, which means a serious invalidation of results, and not a loss of air as in the case when leaks occur in the Tissot. They state further that in the Benedict portable the carbon-dioxide values are too high for use in obtaining the respiratory quotient, and that it cannot be cleaned.

The question of the relative advantages and uses of the Benedict portable and the modified Tissot have been made the subject of a careful study by Carpenter, Hendry and Emmes (I. 7). Their statement is similar to the above, in that they conclude that when rapid determinations of the basal metabolism only are required and approximate values suffice, the portable Benedict is to be recommended as avoiding the time consuming gas-analysis of the Tissot; but when information is required upon the action of food or drugs, or the respiratory quotient, or exact data of any kind, the modified Tissot should be used; and they also offset the disadvantage of the gas-analysis by the ability which it brings to the investigator, and the wider field of vision which he gains into the by-paths of respiratory research. Albert H. Rowe in an admirable article recapitulates these points and decides for the Tissot, pointing out that Benedict and Carpenter have both said that a method by gas-analysis where this can be carried through is to be preferred even to the unit system; so also Snell, Ford and Rowntree, who cover the literature well and give an account of 750 observations; and Gardner and Peppard of 400 cases.

McCaskey on the other hand reports a most interesting series of observations done by the portable Benedict, and is enthusiastic in his appreciation of it; as also Else, and a number of other workers who have used this apparatus.

The Benedict portable is undoubtedly a valuable clinical acquisition for the routine determination of basal metabolism where detailed methods are not feasible. Confusion will be avoided, however, if it be recognized that it has its definite place in the clinical armamentarium, and does not replace either the Benedict Unit or the gasometer. Benedict himself, in his most recent article, utters a most serious warning, that the many observations made upon it by relatively unskilled workers be not inaccurately construed. And it would seem to us essential that behind the operation of this technical aid, there should stand in every hospital of good reputation a well equipped respiration laboratory. For this the modified Tissot eminently recommends itself, both by its neat and cleanly procedure and by the simplicity of the Boothby-Sandiford technique.

The reference to Cathcart's article is given in the literature of this retrospect because it describes the Douglas Bag method by which the extensive work carried on in England has mostly been done.

A word only can be said on the clinical import of alterations in the basal metabolic rate as revealed in the very large number of observations which the literature cited here represents. Normal changes lie between relatively narrow limits of − 10 and + 10 per cent., following a similar range, although with somewhat greater fluctuations, to that of the body temperature. Variations appear to depend upon alterations in the active principle of the thyroid secretion, which has to do with the regulation of heat production; and very high values, as + 80 to + 100 per cent. may be said to be pathognomonic of hyperthyroidism. The converse applies to hypothyroidism, in which the rate may be depressed to the lowest figure consistent with life (− 40 to − 45 per cent.). A raised rate is most useful in the differentiation of thyrotoxic from adenomatous goitres, and in the diagnosis of those "borderline cases" of thyroid toxicity without exophthalmos which demand treatment, yet frequently escape recognition. In the "Irritable heart of soldiers", the normal rate has supplied a valuable negative point against the hyperthyroidism sometimes hypothecated. Alterations in the rate with corresponding changes in the clinical picture, follow administration of thyroid with almost mathematical accuracy, and supply an invaluable index in the gradation of therapeutic doses of thyrotoxin, which is cumulative in its effect. Similarly, in hyperthyroidism the surgeon is guided to a definite knowledge of what cases demand interference, and of the effect of lobectomy or *x*-ray treatment, when these steps have been taken, by estimations of the metabolic rate. Without it, he will operate unnecessarily on many cases, and on many others without the success that should be his due.

In conclusion, in any review of this subject a tribute must be paid to Professor F. R. Benedict, who has from the first directed the energies of the Carnegie Institute Laboratory to the practical application of the knowledge gained by the researches which constitute its field, and to whose efforts, seconded by those of Professor Carpenter, the present success of both the unit system and the gasometer method as clinical procedures are primarily due.

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Abstracts from Current Literature

SURGERY

Some Principles Involved in the Treatment of Empyema. GRAHAM, E. A.: *Surg. Gyn. and Obst.*, 1920, Vol. 31.

IN this article Graham reviews three previous articles by himself and Bell. 1. Open Pneumothorax; its Relation to the Treatment of Empyema: *Am. Jour. Med. Sci.*, 1918, 156, 839. 2. Protrusion of Artificial Pneumothorax into the Opposite Untreated Side: *Jour. Amer. Med. Assoc.*, 72, 1445. 3. The Maximum Non-fatal Opening of the Chest Wall: *Jour. Amer. Med. Assoc.*, 1919, 73, 1934.

It is shown that the former prevalent conceptions of the mechanism of action of an open pneumothroax are incorrect.

In the normal thorax the mediastinal structures, instead of constituting a more or less rigid partition between the two pleural cavities, are in reality so mobile that to air pressure they offer a resistance which is equivalent to the pressure exerted by a column of water only 0·5 c.c. to 1·0 c.c. high. The thorax can thus be considered as one cavity instead of two. Pressure in one cavity compresses both lungs about equally. The situation in this respect is the same in the dog as in the human; experimental results obtained on the dog can be directly applied to the human.

The likelihood of a fatal asphyxia as the result of an open pneumothorax depends upon a number of factors. Important are the size of the opening and the vital capacity of the individual.

The maximum non-fatal opening can be determined mathematically. An average vital capacity (3700 c.c.) can withstand an opening in the thoracic wall of fifty-one square cm. (eight square inches), but the individual of exceptional vital capacity (as for example 7,100 c.c.) can live with an opening of 101 square cm. (15·6 square inches). If the vital capacity is so low as to approximate the tidal air, even a very small opening may be fatal.

After adhesions have formed the pressure relationships may be materially different on the two sides.

The article briefly considers other effects of open pneumothorax such as heat loss, changes in the systemic circulation, and infection.

The value of Dakin's solution in sterilizing and obliterating empyemic cavities is shown as well as its decorticating activity.

F. B. G.

Thoraco-Abdominal Injuries: Some Technical Procedures Developed by the War. HEYD, C. G.: *Annals of Surgery*, 1920, Vol. 72, p. 370.

IN the earlier work injuries to the diaphragm were repaired through the abdomen; it was only when a rational technique was established that it was found easier to repair the diaphragm through a thoracotomy wound. Even large tears can be easily sutured or approximated to the chest wall. It is essential that tears in the diaphragm be repaired.

There are obviously well defined limits to the amount of work that could be performed upon the viscera of the upper abdomen through the thoracotomy wound. Secondary laparotomy was necessary to supplement the thoracic technique and to deal specifically with the abdominal condition.

It was early established that the lung tissue itself, by reason of its peculiar vascularity, was quite able to take care of a considerable degree of infection. The handling of the lung was not associated with marked fall in blood pressure and was not associated with the same degree of shock as would be induced by similar manipulation of the intestines.

A critical review of thoraco-abdominal injuries and the surgical procedures adopted to deal with them together with the immense collective experience derived from battle surgery, would seem to suggest a wider technical application to major thoracotomy to deal with lesions involving the diaphragm and the viscera immediately subjacent to it. Lesions of the diaphragm (hernia), of the liver, superior cardiac portion of the stomach, and some spleen lesions might offer better results by transthoracic laparatomy than by the present classical method.

F. B. G.

Diaphragmatic Hernia. Bevan, A. Dean.: *Arch. of Surg.*, 1920, Vol. 1.

Bevan has recently operated upon four cases; this contribution is based upon a study of these cases. Hernia through the diaphragm is, 1. Congenital, 2. Acquired (as in ordinary inguinal hernia). 3. Traumatic. Group one may occur at one of several points: (a) In front at junction of ensiform and costal cartilages, (b) Between the psoas muscle and ribs, (c) Œsophageal opening, (d) Opening for vena azygos and phrenic nerves. In cases of congenital hernia the presence of symptoms determines operation. In acute traumatic cases operation for repair of the diaphragm may be either by abdominal or thoracic route. Bevan's paper deals with hernia of acquired type. These occur through the œsophageal opening on the left side. Contents consist of stomach, omentum, transverse colon, and rarely the small intestine. The condition is analogous to inguinal hernia; *i.e.*, a sac is present, sometimes reducible, sometimes irreducible.

The clinical symptoms are those of abdominal distress, such as are present in gastric ulcer, gall-stones, or pyloric obstruction. In one case pain was severe and simulated gall-stone icolic. When the colon is included the symptoms simulate carcinoma of the large bowel. The radiograph makes the diagnosis.

If symptoms are present an attempt at surgical cure should be made. Bevan uses S incision. Reduce the hernia by traction and suture the pillars of the diaphragm, taking large bites. Bevan states that closure of œsophageal opening is comparatively simple through an abdominal incision. In addition he has sewn stomach to the diaphragm or to the parietal peritoneum. Post-operative treatment is similar to that for pyloric resection. Instructive drawings and adequate reports of cases accompany the article.

F. B. G.

Tendon Transplantation for Wrist Drop. Speed, Kellogg: *Surgical Clinics of Chicago.*

Mention is made of an operation for the temporary relief of wrist drop, by transplanting one-half each of the flexor carpi radialis and ulnaris tendons into the bases of the second and fifth metacarpal bones respectively. This did not, however, relieve the dropped fingers.

J. B. Murphy (1915) used the flexor carpi radialis alone, putting it into the extensors of the thumb and fingers.

Dr. Speed now describes an operation for permanent relief of wrist and finger drop. He uses the flexor carpi radialis (going to the extensor brevis pollicis and the abductor longus pollicis), the flexor carpi ulnaris (going to the extensor communis digitorum, the extensor indicis and the extensor longus pollicis), and lastly the supinator brevis (inserted into the belly of the extensor communis digitorum).

Excellent pictures are given of the technique, and it is said that an ultimately excellent functional use is the usual result.

J. A. N.

Arteritis Obliterans. Beck, Earl: *Surgical Clinics of Chicago*, December, 1920.

The author reports the case of a Russian Jew of thirty-eight years, with ulceration and loss of substance in several toes and marked impairment of the circulation. No other evidence of disease is present. Different kinds of treatment had been tried without success.

Dr. Beck cured this case by having him dip his feet into hot and cold water alternately, 15 to 20 minutes in each—neither the high nor the low temperature to be of extreme degree.

J. A. N.

The Orthopædic Treatment of Burns. Harrington, A. H. and Boorstein, S. W.: *Annals of Surgery*, November, 1920.

Attention is drawn to the well-known contracture deformities following burns, and the preventive measures in use at the Fordham Hospital are described. Particular attention is given to the prevention of deformity in burns of the neck, upper arm, elbow, fingers, etc.

From an extensive experience the authors conclude that contractures resulting from burns can easily be prevented by simple orthopædic measures and posturings adopted from the beginning of treatment; that early recovery is obtained and the fixation of the parts in proper position accelerates healing.

The importance of the subject dealt with in this paper commands the attention of all practitioners.

J. A. N.

Malignant Adenopathy of Bones of Foot, Probably of Thyroid Gland Origin.
Brown, H. R.: *Jour. Amer. Med. Assoc.*, December 25th, 1920.

This is a case report describing malignant adenomata in a woman's fibula and foot, thought to have been metastases from a thyroid tumor removed five years previously. The nature of the thyroid tumour was unknown.

The Nature of Arthritis and Rheumatoid Conditions.
Pemberton, Ralph: *Jour. Amer. Med. Assoc.*, December 25th, 1920.

A very interesting and instructive article emphasizing the physiologic and metabolic aspects of arthritis. It follows several previous studies on arthritis by the same author who feels that focal infection alone is not sufficient to explain many of the phenomena of this disease. The article does not lend itself to condensation, but its perusal is recommended to all interested in the arthritides. J. A. N.

Removal of the Astragalus in Paralytic Feet.—Results in 217 Cases.
Sever, James Warren: *Jour. Amer. Med. Assoc.*, October 30th, 1920.

A careful analysis of the end results of astragalectomy, with special attention to the Whitman operation. The author feels that while this operation has a definite field of usefulness it is often performed unnecessarily, as for example to relieve ankle instability where but one muscle group is paralyzed, or to cure a limp. It is to be noted that the operation of astragalectomy was originally described by Whitman as a treatment for calcaneo-valgus deformity, since which time it has been used for various other types of lateral instability at the ankle. The tendency to varus and equinus deformities following the operation is noted.

Dr. Sever concedes that it is as good an operation as any in flail feet, or those with only one muscle group left. J. A. N.

Tuberculous Arthritis of the Knee Joint: Ankylosis in a Faulty Position; Knee Joint Resection.
Beck, Carl: *Surgical Clinics of Chicago*, December, 1920.

Patient is a boy of nine years with knee-joint tuberculosis which has been present for three years and is still active. There is ankylosis at almost right angled flexion.

In the absence of deformity this disease can be cured by conservative measures, *x*-ray exposures being of service. As it is, an ankylosis in good position is the best result attainable. This is secured by removing bone from both femur and tibia, allowing only slight flexion to remain. *x*-rays will then be used to destroy what tuberculous foci may remain. J. A. N.

Bone Cysts.
Montgomery, A. H.: *Surgical Clinics of Chicago.*

Two cases are presented, one being a six year old girl who fractured her humerus just below the head, as the result of but slight violence. An *x*-ray revealed an egg-shaped area of rarefaction, through which the fracture line extended. With non-operative immobilization, the cyst cavity became filled in solidly by callus formation.

The second case, a woman of twenty nine, showed extensive bone cyst of the upper end of the femur with pathological fracture of the neck, and non-union. The cyst was opened into from the lateral aspect, curetted, and cauterized with phenol followed by alcohol. The cavity had no lining membrane, and was left filled with glycerine and iodoform emulsion.

New bone formation gradually closed in the cyst cavity and a good solid union of the fracture resulted.

A discussion of bone cysts, infections, metaplastic and neoplastic, follows. J. A. N.

X-rays in the Treatment of Fibromata and Uterine Hæmorrhages.
Panneton, J. E.: *Amer. Jour. of Roentgenology*, November, 1920.

Surgical intervention is the treatment of choice in dealing with very large tumours which may give rise to grave pressure symptoms; in tumours of rapid growth, pedunculated tumours, tumours complicated by cystic or inflammatory lesions of the adnexa and in those undergoing a process of malignant degeneration.

Rœntgenotherapy is employed most successfully in the following cases:—

1. In small simple fibromata, characterized only by a sensation of weight or fatigue in the lower abdomen, with menorrhagia.
2. In large fibromata palpable through the abdominal wall rising perhaps as high as the umbilicus and accompanied by such symptoms as

the mechanical type of constipation, very difficult to overcome and due to pressure on the iliac colon; frequent micturition due to diminution of the capacity of the bladder by pressure; lumbar and sciatic pain due to pressure on the lumbar and sacral plexuses. The menstrual periods may be normal as to amount and duration, or may be slightly increased in both.

3. In fibromata of any size accompanied by more or less severe hæmorrhage.

4. In uterine hæmorrhages of non-infectious origin and in certain painful menorrhagias without demonstrable fibroids.

5. In uterine hæmorrhages with sub-involution, or in hæmorrhages preceding a delayed menopause.

In all of these cases results obtained are such as to be best represented by the words, "Cure" or "Clinical Cure", provided that the dose administered has been considerably more than that actually necessary to produce the menopause.

Panneton quotes Dr. A. Beclère, of the Hôpital St. Antoine, Paris, in the "Archives d'Electricité Medicale", showing success in 96 to 97 per cent. of the cases. These figures are from selected cases, for in each case it was only after careful study of the therapeutic indications or contraindications that rœntgenotherapy was judged preferable to surgical intervention.

Youth is not a barrier to the production of an artificial menopause provided there is a therapeutic indication for it. Other things being equal the younger the patient the longer the time required to produce it. It is necessary to warn young women that complete sterility may be produced.

Amongst the advantages of rœntgenotherapy, the following are enumerated, namely, the elimination of whatever risks there may be from an anæsthetic; the elimination of the possibility of post-operative hernia, hæmorrhage, suppuration or adhesions. The patient is not bed-fast and rœntgenotherapy has no mortality percentage.

Panneton's statistics include forty-four cases, the ages varying from thirty-seven to fifty-five years. Forty-one were clinical cures; three were failures; two of the failures were due to diagnostic errors and the cause of the third is imputed to the patient.

If the patient does not experience a marked improvement after the third or fourth series, it is either not a case of fibroma or else adnexal complications are present which require surgical intervention.

Dr. Panneton follows largely the technique described by Dr. Beclère, that is, radiation of the two ovarian regions anteriorly, directing the rays obliquely through the uterus. In some cases he tried the method of multiple ports of entry, eight anterior and eight posterior, but did not appear to produce the menopause any more rapidly than by the more simple method of Beclère. Dr. Panneton works with a parallel spark gap of twenty to twenty-two cm.; three millimeters of aluminum, and radiant energy equivalent to 16 X. In women more than fifty years of age the menopause was produced by one or two treatments; from forty to fifty years by three or four treatments; from thirty to forty years five to seven treatments. As to fibromata, the number of applications required to make them disappear varied from five to ten series according to their size and age. Some of the very large tumours disappeared completely, apparently they were clinically cured, the signs and symptoms disappearing. One case of a large pedunculated fibroid was unaffected by rœntgenotherapy and the treatment was abandoned. In some cases where it was desirable to produce prompt results four ports of entry were used. When two ports of entry only were used, malaise, vertigo and nausea were much less evident than when many ports were employed. In serious cases where immediate action is indicated, doses of thirty or even forty X have been used with excellent result upon the hæmorrhage, but in these cases the general effects have been more marked. The results obtained by Dr. Panneton have been permanent, the earlier cases dating back eight years.

W. A. W.

MEDICINE

Epidemic Hiccough. Achard, C. H., and Rouillard, J.: *Bul. et Mém. Soc. Med. des Hopitaux de Paris*, December 23rd, 1920, p. 1534. Ricet, M. L.: Same Vol., p. 1541.

These authors point out over thirty cases of this condition met within a week. In the discussion which followed their papers, it was shown that about five out of six doctors had had similar cases to treat. The majority of patients were men, often with a history of a light attack of influenza some months previously. The onset was generally sudden with slight fever, headache, and sometimes digestive disturbance. The hiccough itself varied in intensity from a slight one at fairly long intervals to a severe spasm of the diaphragm occurring five to ten times a minute. More careful examination of this in some patients revealed clonic contractions of this muscle on one side only, as was proved by x-rays, often without the peculiar sound due to closure of the glottis so characteristic of this affection. In addition there was a condition of myo-clonus of the anterior, abdominal muscles, as well as to a lesser degree, of those of the neck. These rhythmic waves of contraction were more pronounced on one side than on the other. In some cases the onset was preceded by brachial or cervical neuralgia for a few days.

These points differentiate it from a hysterical manifestation, and tend to show its relationship, if not its identity with epidemic encephalitis of a toxic nature.

As a rule the affection was of a mild type lasting a few hours to a few days. Compression of the eye-balls seemed particularly efficacious in treatment. J. L. D. M.

The Diagnosis and Treatment of Some Disorders of the Endocrine Glands. Murray, G. R.: *Brit. Med. Jour.*, November 27th, 1920, p. 807.

Early diagnosis of endocrine disorders is of great importance. Particularly is this the case in disturbed thyroid function, where early medical treatment may save the long months of invalidism associated with the control of a full blown hyper or hypothyroidism. The author recommends not only a careful history, but also a thorough examination of the diseased gland: inspection and palpation play a dominant rôle in the differential diagnosis of simple thyroid enlargement, of cystic, and of adenomatous goitre. The presence and degree of compression of the trachea may be ascertained by auscultation over the trachea between the cricoid cartilage and the top of the sternum. A flattened trachea gives a high pitched inspiratory and expiratory breath sound. The size of the goitre is no criterion of the presence or absence of tracheal pressure. X-rays may be of use in detecting retrosternal goitre and tracheal displacement.

The degree of functional activity of the gland is to be gauged only by a careful study of the patient. Murray emphasises the importance of symptoms in the stage of onset; the lassitude, loss of weight, change of disposition, fine tremor, and slightly increased pulse rate. Palpitation and over response to slight exertion and emotion are also in evidence. Careful search usually reveals some one or other of the eye signs, and some thyroid enlargement. In these early cases studies of basal metabolism are a great help in distinguishing a true hyperthyroidism from early tuberculosis or from a cardiac neurosis. They also offer a means of following the effects of treatment.

Medical treatment consists in rest in bed for a few weeks; later twelve to sixteen hours a day usually suffices. A liberal dietary should be prescribed, chiefly of carbohydrate and fat, meat and meat extracts should be avoided, as they seem to stimulate thyroid activity. X-rays exposure at short intervals, or radium at longer intervals will control early cases in three to six months, but one to two years of radiotherapy may be required for the more fully developed types.

Hypothyroid states are also of vital importance in childhood, where early thyroid treatment may remove all trace of glandular deficiency. In children the signs are delayed growth, coldness of the extremities, and slight thickening of the subcutaneous tissues; in adults gradual loss of energy, slowed mentality and loss of memory may suggest a hypothyroidism, as well as the more usual skin changes, etc. Thyroid medication is required permanently in these persons, and the dose may have to be increased as time goes on, due to a progressive atrophy of the gland. (Dose: half to two grains daily for children and three to five grains for adults.)

Pituitary disorders can be diagnosed only by indirect examination. The symptoms fall under two heads, those arising from pressure on the surrounding tissues, the "neighbourhood symptoms" of Cushing, and those due to a disturbed fuction of the pituitary, the "glandular symptoms". The former include temporo-frontal headache, bitemporal hemianopsia, and oculo-motor paralysis. Excessive activity of the gland results in gigantism in the young, and the well-known acromegaly in the middle aged, while a decreased activity may result in the lack of sexual development at puberty with a large increase in the subcutaneous fat, that is an adiposo-genital dystrophy. In the adult the fat has a typical distribution, the supraclavicular fossæ, the backs of the arms, fronts and sides of the abdomen, the hips and the upper thighs are the sites of election, the hands, feet, wrists and ankles being little changed. In these cases the sugar tolerance is markedly increased, while in hyperactivity of the gland the tolerance is lowered.

The polyuria of diabetes insipidus is also associated with a hypoplasia of the tuber cinerum, and can be controlled by injections of pituitrin (1 c.c. daily) over long periods, but oral administration of the dried gland does not give such gratifying results.

The medulla of the suprarenal glands produces adrenalin, a powerful stimulant to the sympathetic, while the cortex is probably concerned with the development of the sex glands. Destructive lesions of the adrenals, particularly tuberculosis, give rise to the symptoms of Addison's disease. Progressive asthenia, low blood pressure, and pigmentation of the skin and the buccal mucosa, are early signs of adrenal insufficiency. Unfortunately we are unable to control this insufficiency by the use of adrenal tissue in any known form, either by injection or ingestion. Adrenalin has a powerful action on smooth muscle, causing instant relaxation, and this action may be used in the treatment of bronchial asthma and of œsophageal spasm.

D. S. L.

The Contents of the Stomach: Its Study and Interpretation. Best, E. J.: *Amer. Jour. Med. Sci.*, December, 1920, Vol. 170, p. 889.

Best believes that the fractional method, carefully interpreted, gives vastly more information than the old "one sample test" of gastric analysis. A "Rehfuss" tube is passed into the fasting stomach in the morning, the patient having taken a few prunes on retiring. Fasting contents should not exceed 100 c.c. The tube is removed and an Ewald meal of bread and water given. After half an hour, the tube is again swallowed and 3 to 5 c.c. contents aspirated, every fifteen minutes for the two hour period, when the residue is aspirated and measured. In titrating the fractions, 1 c.c. of contents, using N-100 NaOH gives standard readings. A curve is then plotted, using the acid figures as ordinates, the time as abscissæ. The actual acid values mean little; note rather the fasting acidity, the apex, and position of curve in two hours and relation of free HCl to total acid. There are five main groups:—

1. The normal, where there is moderate fasting acidity; the apex is reached in one to one and one-half hours (sixty to ninety total) and moderate decline—free acid following the total, about 20 degrees below. 2. Frequently, a high fasting acidity which drops quickly after the meal and rises steadily to a high value at the end of the two hour period, the free acid often approaching the total. In this group may fall cases of gastric ulcer, duodenal ulcer, gall bladder infections and chronic appendicitis. 3. This type shows a moderate or low total acid with free HCl showing an irregular relationship. Cases of subacute gastritis—or chronic focal infections in the mouth, gall bladder, etc., may fall into this group and the microscopic examination helps the diagnosis. 4. Is a progression of three. HCl is very low and irregular, appearing only in some specimens; cases of chronic gastritis of long standing, and malignancy often fall into this class. 5. Is the achylia group, with a low flat total—about ten—and no free HCl. Ferments are also absent.

The recovery of over 100 c.c. of fluid at the two hour period points to retention, or hypersecretion.

A. T. H.

Alimentary Hypersecretion; Gastric Hypersecretion; Gastrochronorrhea. Crohn, Burrill B. and Reiss, John: *Amer. Jour. Med. Sci.*, January, 1921.

The literature on the subject is reviewed from 1882 when Reichmann described a case in which the fasting stomach contained a large amount of gastric secretion. Fifty cases are studied, from the wards of Mount Sinai Hospital, by means of the fractional test meal, care being taken to exclude cases of pyloric obstruction. The normal amount of fasting contents was taken as about 30 c.c., and in this series the average amount was 65 c.c., but amounts from 90 to 130 c.c. were common. One case secreted 30 c.c. every five minutes whereas 1 to 2 c.c. is the normal amount.

Acidity in the fasting contents, in hypersecretion, is much the same as in cases of normal secretion, the average being, free HCl 30, total acidity 50, that is, slightly lower than during the digestive period.

Three classes were distinguished:

1. Continuous hypersecretion, with a continuous flow of large quantities of secretion during, and after digestion and in the fasting state.

2. Continuous hypersecretion occurring inter-

mittently, associated with some condition, such as migraine, tabes or hysteria.

3. Alimentary hypersecretion, occurring during the digestive and post digestive period, and generaly attributed to a pathological condition such as ulcer. It is a common symptom and here the fractional meal is of great value, as the hypersecretion takes place in the late digestive and interdigestive periods, that is after the time when the Ewald meal is removed.

The technique used was, the fasting stomach contents were removed, and then a drink of gruel was given and a little of the contents withdrawn every fifteen minutes by the tube which was left in the stomach. At the end of one and three-quarter or two hours, all the gruel had passed on, and normally the gastric secretion becomes less and less and ceases about this time. If it continues for two or three hours after the last trace of gruel has disappeared, we have a case of alimentary hypersecretion or if it is still more marked and lasts four or five hours we call it a case of continuous hypersecretion or gastrochronorrhea. As the emptying time, that is the time when the last of the test meal left the stomach did not differ from the normal, every case where fluid could be removed after the two hour period, was regarded as one of hypersecretion.

More than 50 per cent. of the cases studied were secreting strongly at the end of three or four hours, and so must be classified as cases of continuous hypersecretion. The free HCl and total acidity were high, the average being, free 62·9 and the total 84·, so that hyperacidity was the rule.

The type of curve of acidity was of interest; a primary digestive curve showing a tendency to return to the base line at the emptying time, followed by a smaller secondary rise to a certain level, which was maintained at that level, usually, till the end of the observations. Diagrams of these curves are shown.

The clinical diagnoses in the cases showing hypersecretion were varied, including duodenal and gastric ulcer, cholelithiasis, chronic appendicitis, migraine, syphilis, etc.

The writers think that 30 per cent. of ulcer cases show hypersecretion and that it may be caused by reflex irritation, from disease in other organs as the appendix and gall bladder. Psychic influences may also cause it, and a case is cited where an emotional disturbance happening in the ward, set it up.

Having carefully reviewed the literature, and from a consideration of the cases studied, the writers do not think that Reichmann's disease exists as a clinical entity.

R. H. M. H.

A New Diet for Gastric Ulcer. Coleman, W.: *Proceedings of the Soc. for Exp. Bio. and Med.*, November 17th, 1920, Vol. 18, p. 43.

In the author's opinion the diets usually employed in the medical treatment of gastric ulcer fail in their two most essential points; that is (1) "to protect the ulcer from mechanical and chemical injury, and (2) to maintain the nutrition of the patient at a level which will favour the healing of the ulcer. The diet proposed consists of a preliminary three to five days' rest for the stomach through the use of glucose enemata, 300 c.c. of a 7 to 12 per cent. solution by the Murphy drip method, three or four times a day. Then olive oil is given by mouth, at first in small quantities, increasing gradually up to 150 c.c. a day (gives 1395 calories). After two or three days of oil feeding the whites of two or three eggs a day are added. These are increased to five or six a day (gives 7–8 grams of nitrogen with 450 calories). The 100 grams of glucose given per rectum throughout the treatment increases the total caloric intake to 2,200 per day. This regime is continued for three to four weeks.

The diet is supported by Pawlow's work which has shown that egg-albumen does not call forth gastric secretion, and that oils inhibit it. Coleman has used it for eight years with satisfactory results.

E. H. M.

Prevention of Diabetes Mellitus. Joslin, E. P.: *Jour. Amer. Med. Assoc.*, January 8th, 1921, Vol. 76, p. 79.

In a comprehensive article, Joslin brings before the profession the importance of obesity as an ætiological agent in diabetes mellitus. The study of a series of 1,000 consecutive cases, in which the age, weight, and height data were complete, shows a closer relation between obesity and diabetes than previous literature has indicated. Using as a basis, life insurance tables for normal weights, his series shows that persons 21 or more per cent. overweight are seventy-nine times more liable to become diabetic than those of the same degree underweight. Great stress is laid upon the early diagnosis of the disease, as it is only through a proper control of the incipient cases that its increasing prevalence can be arrested. E. H. M.

The Rôle of the Electrocardiogram in Prognosis. Heard, James D. and Hein, G. E.: *Amer. Jour. Med. Sci.*, Vol. 160, No. 6, December, 1920.

The authors emphasize the fact that the value of the electrocardiogram as an aid to diagnosis and prognosis, especially in hearts acting regularly at approximately normal rates, has not been fully appreciated by the profession.

Of a total of 780 patients examined, 560 were available for study, under the above limitations.

Various case reports and tracings are presented illustrating distortions of the primary ventricular complex as usually associated with conduction defects below the bifurcation of the main bundle of His, substantiating previous evidence that such tracings are found in patients presenting arborization block. Once established such tracings do not return to normal.

They find that decreased amplitude of the ventricular complexes in all leads, signifies a weak myocardium with a relatively high mortality.

Attention is drawn to the fact, that a prolongation of the P-R. interval and an inversion of T wave in the first lead are of definite prognostic value, only when previous digitalization can be ruled out. C. F. M.

Amyl Nitrite and Vascular Reactions. Richard, Gabriel: *Archives des Mal. au Cœur*, September, 1920, p. 416.

In one hundred subjects, the author carried out a series of experiments on the blood-pressure, after the inhalation of five minims of this drug for two minutes. The reaction varies with the state of the arterial walls and the sympathetic and vagus systems. In arteriosclerosis, there is a weak vasodilator and hypotension reaction with a slow return to normal tension due to loss of elasticity. In non-sclerotic hypertension, these two symptoms are absent. In so-called sympathicotony (predominance of accelerator nerve symptoms), the subjects shows a marked and rapid increase in rate, with deep fall in systolic and diastolic pressures, and especially a characteristic hypertension after the nitrite effect has passed. In vagotony (subjects with predominance of vagus symptoms) the fall is less, there is no secondary hypertension, while extra systoles may appear under the influence of the nitrite. J. L. D. M.

The Influence of Digitalis on the Different Phases of the Heart Beat. Harris, I.: *Quarterly Jour. of Med.*, October, 1919, Vol. 13, No. 49.

The action of digitalis administered by mouth in the form of the tincture was carefully examined by means of the electrocardiograph.

Three distinct phases of its action were discernible. In the first stage marked diminution of the pulse rate is accompanied by prolongation of both ventricular systole and diastole. In the second stage the pulse rate is the same as before the administration of the drug, but systole is shortened and diastole is slightly increased. The third stage is manifested by marked pulse acceleration; the systole is shortened in some cases to more than 50 per cent. that of its length prior to the administration and the diastole becomes even shorter than systole. The passage of the second stage into the third stage is due to increasing intra-cardiac pressure reaching a point at which the musculature is no longer able to bear the strain and dilates with increased pulse rate. In addition to previously described electrocardiographic changes a negative depression is noted in the middle of the ventricular systole due to a rising intra-ventricular pressure and increasing dilation, found only in the second stage. The author warns against the indiscriminate use of digitalis.

Illustrative electrocardiograms and tables are given. C. F. M.

THERAPEUTICS

The Pharmacology of Chelidonin, a Neglected Alkaloid of Chelidonium or Tetterwort. Hanzlik, P. T.: *Jour. Amer. Med. Assoc.*, Vol. 75, p. 1324, November 13th, 1920.

Hanzlik calls attention to the activity of chelidonin, an alkaloid which resembles papaverin and the benzyl esters in its mode of action, but which differs from morphin in several particulars.

It causes depression and narcosis, but unlike morphin it does not cause any subsequent excitation of the central nervous system. It slows the pulse and lowers blood pressure owing to cardiac depression, and it relaxes smooth muscle in all regions. Therapeutically it is indicated in hypertonus, angina pectoris, bronchial asthma, and in intestinal, ureteral and uterine colic.

It is more palatable than the benzyl esters. Owing to its relatively low toxicity, he suggests that it might be given to children with comparative safety, and to a certain extent replace morphin in pediatric practice.

D. S. L.

DERMATOLOGY

Alopecia Areata. BARBER, H. W.: *Brit. Jour. of Derm. and Syphilis*, January, 1921.

MENTION is made of some of the theories as to the ætiology of this disease, neuropathic, parasitic, disorders of thyroid, etc., but in the writer's opinion the *fons et origo* lies in focal infection of the teeth and gums, tonsil, naso-pharynx and sinuses. He holds that streptococcus pyogenes-longus is the infective organism usually responsible. He thinks it hardly possible to exaggerate the importance of focal sepsis in dermatology, especially as regards the tonsils, which may easily be overlooked. In his series of cases, alopecia areata was associated with infected tonsils with or without adenoids, in 62 per cent.; and, combined with oral sepsis, in 25 per cent. Cultures from the teeth, gums and tonsils gave a great preponderance of streptococcus pyogenes longus. Comment is made on the severity of alopecia following erysipelas, also the frequent loss of hair in the influenza epidemic of 1918.

In the treatment, it is admitted that even with the removal of septic foci and subsequent vaccination, there are cases in which there is no growth of the hair, but in his opinion, the most important part of the treatment is always the removal of infective foci, where possible. If no such focus can be found, then general tonic treatment and local stimulation is necessary. For general treatment, he recommends iron and arsenic, where anæmia exists and quotes Sutton as having had good results with urotropine. Local stimulants are, pure carbolic or lysol. Ultra violet rays have been used with good results in some long standing cases. An added note by Mr. Zamora, dwells on the need for most careful examination to exclude infection of the tonsils. He speaks especially of the type of tonsil which, from previous inflammation or incomplete operation, presents a firm scar covering tonsillar remnants, and recalls the consensus of opinion that hypertrophy of the tonsil is no guide to its degree of infection.

H. E. MACD.

The Influence of Trauma on the Distribution of Psoriasis. SMALL, WM., D.D.: *Edin. Med. Jour.*, January, 1921.

REFERENCE is made to the observation that psoriasis frequently follows cutaneous trauma, usually while the disease is active, but sometimes apparently, during the quiescent stage. Two distinct groups of cases were noted during the war. In one group, the disease first showed itself in the region of wounds, but later broke out more or less generally. In the other group, the disease became superimposed on some other cutaneous malady.

Illustrative cases are given of these two types. In one, a soldier, previously quite free from the disease, developed it extensively around a wound on the back, and scattered lesions appeared elsewhere later on. In the other cases, there was an original generalized eruption of scabies and pyodermia, with a small patch of psoriases on each elbow and knee, of long standing. The scabies cleared up with treatment, but it was noted that the lesions gradually took on the character of psoriasis.

Other diseases noted as determining the distribution of psoriasis are seborrhœa and various forms of impetigo. H. E. MACD.

News Items

ONTARIO

EXECUTIVE COMMITTEE OF THE ONTARIO MEDICAL ASSOCIATION WAITS UPON THE HON. WALTER ROLLO, MINISTER OF LABOUR AND HEALTH

ON behalf of the Ontario Medical Association, the Executive Committee of that body waited upon the Hon. Walter Rollo, on Friday, January 21st, to discuss several points of interest to the public and the profession. The Minister gave the deputation a very sympathetic hearing, and evinced keen interest in the various problems presented, among which were the following:

Workmen's Compensation Act

The deputation held that, as very important participators in the working out of the Act, the profession should be represented on the governing body, and that a useful purpose would be served by having a joint conference of the Board with representatives of the Association. The Minister readily consented to arrange the suggested meeting, and stated that changes in the personnel of the Board would likely be announced within the next few weeks.

Inspection of School Children

The Ontario Medical Association humbly submitted that the medical inspection of school children should come under the Department of Health and not under the Department of Education, as at present existing. The Minister informed the Committee that his Department would not be averse to taking over this important work, as the Chief Officer of Health could easily co-relate it with his department.

The Committee stated that they felt that no public health work was of greater importance than the safeguarding of the health of the children, and that a Government which was placing upwards of one-half million dollars in the annual estimates for the Department of Health, would speedily see to it that medical work was supervised and carried out by a medically trained personnel.

Laboratory Facilities

It was held by the medical men that there should be available in every county, a well-equipped laboratory for diagnostic work obviating the necessity of having this work done at distant points, causing delay in diagnosis which might frequently jeopardize the health of the community. The Minister pointed out that the Department was making provision for the establishment of additional laboratories, and that he hoped to see evolved a plan which would make it possible for every county so desiring it to have such laboratory facilities.

Importation of Salvarsan Products

The delegation urged that restrictions should be removed from the importation of salvarsan products having due regard to efficiency only of the products available. In this the Minister concurred.

It was also asked that there be an extension of license of the Department of Health to sell the arsephenamine now being manufactured by the Department, to medical men in the province for use in private practice. In this the Minister concurred.

The Ontario Temperance Act

The delegation felt that, as the workings of this Act imposed certain obligations upon the medical profession, they should have the privilege of conferring with the Board of License Commissioners to discuss problems which have arisen. The Minister pointed out that, although the Commissioners were not associated with his department, he would be glad to arrange the conference through the Attorney-General and that the request would undoubtedly be granted.

MODERN CLINIC FOR PETERBOROUGH

Believing that co-operation makes for efficiency, six of the leading practitioners of Peterborough many months ago conceived the idea of uniting their resources in the establishment of a group system of practice. The outcome has been the opening of the Standard Medical and Surgical Clinic, a most modern and thoroughly equipped building staffed by Doctors G. Stewart Cameron, Malcolm McCul'och, A. Moir, Frank S. Neal, J. B. Mann and J. H. Eastwood, all of whom have enjoyed successful practices in Peterborough for some years.

No expense has been spared in placing at the disposal of the staff the best and most useful appliances that modern science offers. Special attention has been devoted to *x*-ray and laboratory facilities, permitting of the most careful and exhaustive diagnostic procedures.

Although each member of the staff is taking over a certain division of the work, which obviously makes for efficiency, the family-doctor idea is not being entirely obliterated, as each will see his own patients at the clinic as has formerly been done at the respective homes, while the services of the whole group are available according to the requirements of the individual case.

The extreme care which has been exercised by the personnel of the clinic in every detail connected with their structure, their plans of operation and co-operation, together with the splendid professional reputation which each one enjoys, bespeaks a very useful and successful future for the undertaking.

LANARK COUNTY ORGANIZES MEDICAL SOCIETY

At an enthusiastic meeting of the practitioners of Lanark County held in Smith's Falls, on Friday, January 28th, it was unanimously decided to organize a County Medical Society to be directly affiliated with the Ontario Medical Association. The visitors to the meeting were Dr. H. A Boyce, of Kingston, counsellor for the division in the Ontario Medical Association, who spoke on "The need for better Organization of the medical profession", and Dr. T. C. Routley, Secretary of the Ontario Medical Association, who endeavoured to elaborate the points set forth by Dr. Boyce.

The scientifice programme was provided by Professor J. A. Austin, of Queen's University, who gave a very excellent paper on the "Gall Bladder".

In the organization of the society, the officers elected were: President, Dr. W. A. Gray, Smith's Falls; Vice-President, Dr. A. W. Dwyer, Perth; Secretary-Treasurer, Dr. R. M. Ferguson, Smith's Falls. It was agreed by all present that much good work could be done by such an organization in the County of Lanark.

NIAGARA DISTRICT MEDICAL ASSOCIATION

The Niagara District Medical Association held a very enjoyable and profitable meeting on Wednesday, January 26th, at the Clifton Inn, Niagara Falls. A large number of local practitioners sat down to dinner at 7 p.m., and later listened to a very excellent paper by Dr. J. T. Rice, of Buffalo, on "Thyroid Therapy". Dr. Rice gave the meeting considerable food for thought and discussion in connection with the work which is being done on the thyroid gland. Particularly interesting was the fact that the discussion which followed Dr. Rice's paper was heartily entered into by most of the men present. Dr. Routley, of Toronto, was also invited to the meeting to speak on the subject of "Impending Medical Legislation". Dr. Routley reviewed the present situation of the practice of medicine in Ontario, pointing out the loopholes which allowed irregulars to practice in the province. A very free and frank discussion developed, most of the men present having very sound arguments in favour of suppressing the irregular practitioners.

NORTH WATERLOO MEDICAL SOCIETY

A very excellent meeting of the North Waterloo Medical Society was held at the Collegiate Institute, Kitchener, on the evening of Friday, January 14th. An unusual feature of the County Medical meeting was the presence by invitation of a large number of nurses to hear the address of Dr. Norman Gywn, of Toronto, on "Encephalitis Lethargica". Dr. Gwyn's paper proved to be extremely interesting and instructive to the large and representative gathering which was present. Additional interest was afforded by the presentation of a number of slides illustrating the subject. By unanimous resolution, a hearty vote of thanks was tendered to Dr. Gwyn for the splendid manner in which he had handled this subject of rather new and consuming interest. The meeting was also addressed by Dr. Routley, the Secretary of the Ontario Medical Association on the subject of better organization.

LAMBTON COUNTY MEDICAL SOCIETY

The Lambton County Medical Society held their regular quarterly meeting at Wyoming, on Wednesday, February 9th, at 2.30 p.m., with Dr. J. Bell of Sarnia, the President, in the chair, and a very representative group of practitioners in the county present. This being the annual meeting of the society, an election took place. The officers for the ensuing year will be: President, Dr. C. W. Sawers, of Watford; Vice-President, Dr. G. H. R. Hamilton, of Petrolia; Secretary-Treasurer, Dr. C. R. Smith, of Petrolia.

An interesting paper on the "Gall Bladder" was read by Dr. MacDonald, of Sarnia. Dr. Routley, Secretary of the Ontario Medical Association, outlined some of the work which the Association was undertaking, laying particular emphasis upon the need for better medical legislation. Following the address, the meeting developed into a round table conference, every gentleman present being asked to take oart. In this way, exchange of ideas added very much to the interest and profit of the meeting.

SOUTH WATERLOO MEDICAL SOCIETY

The regular meeting of the South Waterloo Medical Society was held in Galt, on Thursday, February 10th. At the afternoon session Dr. J. A. Oille, of Toronto, conducted the clinic on a number of heart cases. Dinner was served at 6 p.m. The evening session was addressed by Dr. T. C. Routley, of Toronto, on the subject of "Impending Medical Legislation". The attendance was good, and the meeting altogether a successful one.

ALBERTA

At the last meeting of the Alberta Medical Association the President, Dr. F. W. Gershaw, in his address, gave tribute to the memory of the late Dr. J. D. Lafferty as a man of high ideals, a good physician and a good citizen. He entered a plea for the better care of maternity cases and laid emphasis upon the desirability of giving every prospective mother the comfort and safety that modern science provides. He urged a campaign to spread the knowledge of the contagious nature of tuberculosis, and drew a contrast between the free treatment of venereal disease with the lack of it in tuberculosis.

He urged the necessity of giving every child the right to be well born, intelligently and adequately fed, clothed and sheltered that thus we might avoid the 30 per cent. of disabilities found amongst the young adult population, disqualifying for military service.

Book Reviews

PUBLIC HEALTH AND HYGIENE: In Contributions by Eminent Authorities. By WILLIAM HALLOCK PARK, M.D., professor of bacteriology and hygiene, University of Bellevue Hospital Medical College, etc. 884 pages. Price, $10.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

THIS is one of the latest works on hygiene and public health, and its appearance is welcome. The editor, Dr. W. H. Park, is well-known to the medical profession as a noted authority on many public health subjects. The names of those associated with him are also familiar to many medical readers.

The book contains thirty-one chapters and thus covers a wide range of subjects—the usual ones met with in works of this kind—and some additional ones.

The chapter on the prevention of individual infectious diseases with special reference to influenza is very valuable. It has a full account of the report of the committee of the American Public Health Association on the epidemic of influenza in 1918. Detailed instructions are given with regard to the preventive and administrative measures found most effective at that time.

The growing importance of housing in public health work is deservedly recognized by its inclusion in this book as a special chapter.

The subject of milk in all its sanitary phases is dealt with in a very comprehensive and thoroughly up-to-date manner. Two chapters are given to it and they are among the best in the book. The methods of securing public sanitary control of the milk supply are outlined; the sanitary requirements of dairies are laid down; the diseases transmitted by milk are discussed. The question of pasteurization is fully considered and the reasons for and against are plainly stated. The results of the investigation of milk used for infant feeding are very illuminating and complete and the conclusions arrived at quite convincing. Dr. Park is right in insisting that milk should be supervised "at every stage from the dairy to the breakfast table".

The chapter on water supplies and their purification does not come up to expectations. The treatment of this important subject is altogether too brief. There is no mention either of the distribution of water or domestic purification.

The book contains a very timely chapter on rural public health work. The importance of selecting the proper type of qualified physician as health officer is stressed, and the organization of a rural health department is laid down on a very sound and practical basis. The necessity of making reports, keeping records and conducting sanitary surveys is dwelt upon—and the manner in which this can be done is indicated.

The chapter on sewage is very weak. Nothing is said of the chemical principles upon which sewage disposal is founded, and this extensive subject is covered in a little more than half a dozen pages.

Among some of the excellent chapters are those in industrial, child, mental and personal hygiene and vital statistics.

The book in hand which runs to 884 pages is well printed, the paper is good, and the illustrations are neatly executed. Though not considered a satisfactory text-book for students it is very valuable for reference purposes and can be recommended to physicians and especially to public health officials. R. ST. J. M.

SCURVY, PAST AND PRESENT. By ALFRED F. HESS, M.D., clinical professor of pædiatrics, University and Bellevue Hospital Medical College, New York City, 279 pages with illustrations. Publishers: J. B. Lippincott Co., Philadelphia, London, and 201 Unity Building, Montreal, 1920.

So many isolated observations have appeared recently on the vitamines and the deficiency diseases, that it is a relief to turn to a good critical review of one of these disorders.

The disease is treated under the usual heads: natural history, ætiology, pathology, clinical picture, etc., but in addition there are excellent chapters on the anti-scorbutic vitamine, the anti-scorbutic foods, and the treatment of the disease.

Our knowledge of the metabolism of scurvy is still in a very confused state, only two or three cases have been studied by the newer methods, and the results so far obtained suggest that we are not attacking the problem from the correct standpoint. Hess also presents a very good section on the relation of scurvy to the other deficiency diseases; here he allows himself a certain freedom of speculation, but elsewhere there is a notable adherence to facts.

The monograph will find a ready acceptance with those engaged in pædiatric practice, where scurvy is still of relatively frequent occurrence due to the popularity of pasteurized milk and the proprietary foods. D. S. L.

International Clinics. A Quarterly of Illustrated Clinical Lectures and especially prepared original articles on treatment, medicine, surgery, etc. Edited by H. R. M. Landis, M.D., Philadelphia, U.S.A., with the collaboration of Chas. H. Mayo, M.D., and others. Volume iii, thirtieth series, 1920. 297 pages. Publishers: J. B. Lippincott Co., Ltd., Philadelphia and London, 1920.

The chief interest of the present volume centres in McCrae's clinic on aneurism of the hepatic artery. There are also notes on the syphilitic phlebitides, sterilization of the mental deficients, and a report on six cases of thymic dyspnœa with a short critical review of thymus surgery. Dr. Mary O'Malley presents some of the newer ideas regarding the psychopathology and treatment of certain of the psychoses, in a very interesting thesis.

The section on industrial medicine also contains the usual series of case reports with a critical discussion of each, which will have a very real value to those engaged in industrial practice.

D. S. L.

Le Typhus Exanthematique. By Dr. M. Jeanneret-Minkine, Price 2/9. Published by Librairie Payot & Cie, 106 Boulevard Saint-Germain, 1915.

It is good, occasionally, to read a book in a language other than our own. It is good, occasionally, for practitioners to read of diseases and of conditions that are not familiar to them. For these reasons this little book, written by a young Swiss physician who served in Serbia during the the war, is well worth reading. The French is beautifully lucid. His style is logical and connected. The book holds no dry page from cover to cover. The clinical descriptions have a wit that is the more striking since the symptoms are largely based upon the author's own experience of the disease—he narrowly escaped with his life. His descriptions of conditions during an epidemic; the advice for the management of a civil population, of soldiers, and of hospitals, are vivid and bear the clear imprint of a practised understanding. The importance and deadliness of the disease are impressed by a mention of the millions who have died of it during the past few years, and by the names of six well-known research workers who were lost while studying the disease during the war. It is made very clear that typhus is a disease of misery which, far from being extinct, will continue wherever lack of means, resulting from war or famine, forces men to live crowded together in verminous and unclean surroundings.

J. L. T.

Surgery, Reconstructive and Orthopædic Appliances, Pensions. ("Chirurgie Réparatrice et Orthopédique Appareillage et Invalidités".) Edited by M. M. Jeanbrau, Nove-Josseraud et Ombredanne and numerous contributors. Masson & Co., Paris.

This recent publication is very extensive in its scope. It consists of two volumes comprising 1294 pages and 1036 illustrations in two divisions.

The first division takes up in general the method of repair in wounds of the integument, vessels, nerves, muscles and tendons. The formation and pathology of callus is considered and following that the rôle of the bone graft is extensively discussed. (Cuneo.)

The chapter on amputation is very thorough and the importance of the fitting of artificial limbs is emphasized. Following this is an extensive discussion of "Cinematic Amputations" so strongly advocated by the Italian surgeons. The authors confess that they have not yet adopted this procedure as being of permanent use to the patient. (Nove-Josseraud and Lambret.)

The second division of the work discusses the deformities by regions. The opening chapters on facial defects are contributed by Ombrédanne compiled from the Val de Grâce Clinic; following which head and thorax reconstructive surgery is fully treated. The orthopedic surgery of the extremities is the most extensive section of the work. The whole work is a valuable contribution written in the characteristic French style. The regional classification is excellent and each subject is well discussed. W. G. T.

PRACTICAL MASSAGE AND CORRECTIVE EXERCISES WITH APPLIED ANATOMY. By HARTVIG NISSEN, president of Posse Normal School of Gymnastics. Fourth revised edition, 225 pages with 68 original illustrations. Price $2.00 net. Publishers: F. A. Davis Company, Philadelphia. 1920,

THIS little book will be found useful to students of Massage and Remedial Gymnastics and to medical men interested in these subjects. The greater part of the contents is devoted to a description of the various manipulations and movements used in massage treatment and corrective exercises, and is accompanied by numerous illustrations. The author has made some additions to the previous Edition which was published in 1889. The book, however, does not appear to reflect adequately the great progress that has been made in recent years in Physiotherapy. Massage with remedial exercises, particularly the forms used for functional re-education when employed in connection with Hydrotherapy, Radiant heat baths and various forms of Electrotherapy have produced remarkable results in the treatment of disabled soldiers in convalescent homes and military hospitals. Apparently Mr. Nissen's experience has been mainly from civilian practice, as, in his book he makes no reference to treatment for such conditions as shell shock, disabilities due to peripheral nerve lesions and the after treatment of fractures and joint injuries. It is to be regretted that no book has yet appeared which satisfactorily deals with Physiotherapy in its widest sense. F. W. H.

ANXIETY HYSTERIA: MODERN VIEWS ON SOME NEUROSES. By C. L. RIXON, M.D., M.R.C.S., senior neurologist, Ministry of Pensions' Neurological Hospital, and D. Matthew, M.C., M.B., Ch.B., with a foreword by Col. Sir A. Lisle Webb, K.B.E., C.B., C.M.G., 124 pages. Price 4/6 net. Publishers H. K. Lewis & Co. Ltd., London, 1920.

MANY books and articles have been written on the war neuroses. These conditions have been discussed from all points of view, both physical and psychological. The present volume, by Drs. Rixon and Matthew, is a small volume, which discusses one form of these war neuroses, on account of its being the commonest of functional nervous disorders, mainly from the psychological viewpoint. Nearly one-half the book is given to the discussion of the pyscho-pathology of the disorder, and, in this chapter, the authors discuss in a most able manner, the cause of anxiety hysteria. This chapter, in itself, is well worth the publication of this volume, and we would recommend this chapter to be read by physicians who have to deal with patients suffering from a functional nervous disorder. An almost too brief chapter is given on the treatment of the disease, and the authors describe in a few pages some of the conversion symptoms of the disorder. Although a small volume, the authors have clearly shown that functional nervous disorders are a psychological problem, and should be treated from that standpoint. G. S. M.

THE FORM AND FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM. An Introduction to the Study of Nervous Diseases. By FREDERICK TILNEY, M.D., Ph.D., professor of neurology, Columbia University, and HENRY ALSOP RILEY, A.M., M.D., associate in neurology, Columbia University. 1020 pages; 591 figures, containing 763 illustrations, of which 56 are coloured. Price, $12.00. Publishers: Paul B. Hoeber, New York, 1921.

FOR many years neurologists have been endeavouring to teach diseases of the nervous system from the anatomical and physiological viewpoint.

Purves Stewart, in his excellent book "The Diagnosis of the Nervous System", describes the various symptoms found in nervous diseases from an anatomical standpoint. In this present volume, by Tilney and Riley, the authors have gone further. As they state in their preface: "This work is designed to fill the gap between morphology and the practical requirements of clinical medicine. It aims to visualize the living nervous system; to make accessible an appreciation of its vital relation to the functions which go to make up life, as well as the defects in these relations which result in disease."

They have fully achieved their purpose and have opened up a new interest, as well as vision, in neurology. This book cannot be too highly recommended to all those interested in the nervous system.

G. S. M.

A TEXT-BOOK OF BIOLOGY. For Students in General, Medical and Technical Courses. By WILLIAM MARTIN SMALLWOOD, Ph.D., professor of comparative anatomy in the Liberal Arts College of Syracuse University. Fourth edition. Thoroughly revised. 308 pages, with illustrations. Price $13.50. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

THIS text-book is admirably adapted for an introduction to biology after the student has had some laboratory practice, wherever the particular course of instruction laid down in it is more or less closely followed. It embraces the principles governing the life of animals and plants in health and disease. The success which the author has achieved in his efforts to cover so much ground in a volume of 300 pages, including more than 200 illustrations, some of them original, is sufficiently attested by the issue of a fourth edition.

It is therefore permissible to point out a few minor blemishes which could be remedied in future editions. The literature references are given in a meagre fashion, often without indication of date and place of publication, and misprints are frequent. All of the lists require to be "thoroughly revised."

The volume opens with a description of the frog as the type of a complex animal, certain features being selected for special treatment. Without apparent rhyme or reason, a figure of the frog's skeleton is sandwiched between photogravures of the bull frog and the wood frog. But this breach of continuity is less open to objection than the employment of figures drawn from salamanders as text-illustrations for the frog. Thus the heart figure on p. 43 is that of the hellbender (*Cryptobranchus*) after A. M. Reese. In this figure the index letters "R.A." obtrude themselves in staring capitals. They are not mentioned in the legend nor in the text. In the original article from which the figure is copied R.A. stands for "right auricle", but as the right and left anterior venæ cavæ open into it the part so labelled should be the sinus venosus as in all Amphibia without exception. The part called "left auricle" in this figure is obviously the entire auricular division of the heart. This example shows the unsuitability of introducing out-of-the-way types in an elementary text-book, nor is the anatomy of the frog so "exceedingly simple" as the author seeks to convey (p. 19). The sympathetic cords do not lie in the cœlomic cavity (p. 58) but in the subvertebral lymph space.

As a whole the numerous illustrations are well-chosen and well-executed, and the author deserves praise for presenting this synthesis of biological principles, ranging from frog spawn to snake poison, "as Homer's Iliad in a nut." The many topics dealt with include fertilization, fermentation, parasitism and mendelism, and there is an original figure of twin turtles in one egg on p. 289. A. W.

PUBLIC HEALTH AND INSURANCE: American Addresses. By SIR ARTHUR NEWSHOLME, K.C.B., M.D., F.R.C.P., lecturer on public health administration at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore. 269 pages. Price, $2.50. Published by: The Johns Hopkins Press, Baltimore, 1920.

AN excellent review of the progress of public health in England showing the great advance that has been made in the past fifty years.

Throughout the lectures the value of hygiene and preventive medicine is constantly kept before the reader, and also the great service rendered to humanity by the physicians and surgeons who are devoting their time to this particular branch of medicine.

This small volume furnishes valuable information, not only for the medical profession, but also for the laity, especially those associated with public health. D. D. M.

REFRACTION AND MOTILITY OF THE EYE, with Chapters on Colour Blindness and the Field of Vision Designed for Students and Practitioners. By ELLICE M. ALGER, M.D., F.A.C.S., professor of ophthalmology at the New York Post-Graduate Medical School. Second revised edition, 394 pages with 125 illustrations. Price, $2.50. Publishers: F. A. Davis Company, Philadelphia, 1920.

THIS little book has been reprinted a number of times without change since its first appearance, but the recent recrudescence of interest in ophthalmology has made another edition desirable, with some changes and additions. Prepared originally as a series of lectures to the author's post-graduate students, the work includes a number of topics not usually found in books on refraction; but, as the subjects are closely related, their treatment is not without convenience in a manual of this kind. The chapter headings are as follows: Optics; the emmetropic eye; ophthalmoscopy; retinoscopy; the pupil—cycloplegics—miotics—static refraction; hyperopia; myopia; astigmatism; presbyopia—anisometropia—aphakia; binocular vision; normal motility; heterotropia—strabusmus—squint; ocular paralysis; colour-blindness; field of vision; the relation of functional eye diseases to general medicine; ocular malingering.

Dr. Alger writes clearly and concisely; and has treated the subject, so often represented with ridiculous claims, with gratifying conservatism. The Manual can be cordially recommended as a sound guide in the study of the refraction and the motor anomalies of the eye.

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THE ART OF MEDICINE

Frederic Brodie, M.D., F.R.C.S.E.

Vancouver

"Art is long—life is fleeting—experience fallacious and judgment difficult."

Of all the immortal utterances of Hippocrates, the succeeding centuries have proved none to be truer than this. In those remote days, nearly five hundred years before Christ, no experiment had been made, no facts recorded. It was the beginning. The practitioner's armamentarium consisted of a keen eye, a sensitive touch and a logical brain. How readily one can imagine the old clinician of Cos with his comprehensive grasp and broad outlook, mentally visualizing the then almost impenetrable vista of far-reaching possibilities and sadly exclaiming after abundant cogitation, "*ars longa, vita brevis.*" But this realization did not paralyze his initiative and happily for succeeding generations, observations and deductions were made and recorded, and therewith the true science of medicine came into being.

To the theoretic threads of Hippocrates, Galen and Celsus added the supporting strands of anatomical research. It is true that all their additions were not facts, and although many of their errors took centuries to correct, impeding true progress to a very considerable extent, their researches added so much to the vitality of medical science that it survived the dark ages. When we remember that Galen, almost single-handed, surmounted the antipathy of public sentiment to human dissection, we may accord him a position almost equal to that of the Greek Master. Truly, to Hippocrates and Galen, the art of medicine was difficult.

It is to Avicenna and the Arabian School that we owe the preservation of Hippocratic and Galenic teaching through the dark mediæval ages. Afterwards, when medicine took its place in the great Renaissance, the ancient writings were accessible. The sound instinct with which Boerhave, Paracelsus and Ambrose Paré harked back to the ancients, realizing that they had begun in a truly scientific manner, created a debt, which posterity can never repay. Thus began the sound maturity of medicine, from which there has been no turning back.

Foremost in the list of contributors, comes our own Harvey, 1587-1657. After twenty-six years of most exacting and painstaking labour, he made the announcement that the blood of animals circulated through a complex system of vessels. Probably no other event in the evolution of Medicine demonstrated so conclusively the narrowness, bigotry and vindictiveness of the human mind or showed so plainly the unfortunate groove into which bright intellects may fall. No sooner was the discovery made public, than a storm of opposition arose. Medical Europe seethed with the controversy. Letters, theses and pamphlets were written in every centre and spread broadcast. The teaching of the new physiology was forbidden in the medical schools of Paris. Meanwhile Harvey battled against the storm almost single-handed. His patients thought him demented and gradually drifted away until his once lucrative practice ceased to exist. For him, indeed, experience was fallacious.

Presidential Address delivered before the Vancouver Medical Association, October, 1920.

Shortly after Harvey, the illustrous Sydenham, that cool, clear, unprejudiced, keen clinician, illuminated the medical horizon and after him, in the eighteenth century came Hunter and Jenner. These two made numerous contributions to medical science, the former developing the practical phase which Harvey began, and the latter conceiving a great idea which he spent his life in perfecting and bringing to practical value.

Not all the illustrious names in Medical History are those of Anglo-Saxons. Lænnec, of Paris, 1781-1826, was a pathological anatomist of great repute, although he has become known in history for his discovery of auscultation.

Probably no individual contributions to the art of medicine have been greater than those of Lister, the discoverer of the potency of carbolic acid, though not of the drug itself; and his great contemporary, Sir James Simpson, who made practical use of the physiological action of ether and chloroform. This illustrious pair, in launching their theories into the professional ocean, created such waves of controversy that they were almost wrecked in the ensuing turmoil. But the stout ship of truth weathered as it always does the turbulent elements, even the violent blasts of theological fervour and religious dogma, and one can safely say that nothing lent more impetus to professional advancement or ameliorated more human suffering than did the labours of these two men.

Many other names could be mentioned as beacon lights along a tortuous course beset on the one hand with the Scylla of false doctrine and on the other with the Charybdis of unbelief. Rokitansky, Koch, Pasteur, Ehrlich, Horsley and Osler, have all shone with distinct and characteristic brilliance and wielded a decisive influence on the evolution of medicine. They have, bit by bit, built up a sound science and a much respected profession, in which it is our proud privilege to be members. What a glorious heritage. What a sublime responsibility. The efforts of these medical pioneers have considerably altered our present-day standing. There is now no unsympathetic laity and there are no dangerously hostile religious fanatics, while the evolution of the instruments of precision has made theorizing unprofitable and proof almost positive.

As a result, and especially during the past fifty years, the scope of the modern physician has become many-sided. He is no longer only a healer of the sick, but his activities have carried him into such divergent ramifications as public health, social and child welfare, preventive medicine, biological research or the innumerable specialties now in vogue. The cognizance of this multiplicity of effort has been a wonderful stimulation and the physician of to-day is taking more and more, as indeed he should, his rightful place in citizenship, politics and finance. Consequently his daily practice, from which position he must do battle for existence and success, presents four distinct but equally important points of view, vis.: (1) His ambition for the State. (2) His relations to colleagues. (3) His responsibility for the patient. (4) His duty to himself.

1. *Ambition for the State.* I use the word "ambition" after consideration. The true physician is a socialist and loyalty to such a creed must make him ambitious. He is primarily a law-abiding citizen and supporter of regularly constituted authority. He is, moreover, a practical part of the state when by his skill, he diminishes the number of the non-working days of its citizens and proportionally increases the annual return. To do this he must be altruistic to no small degree, and what better evidence could be produced than his attitude toward contagious disease. The state declares that certain pathological conditions, the presence of which is a public menace, must be isolated and the physician automatically assumes a large part of the responsibility for consequent quarantine.

Vaccination against small pox and typhoid have not only been inaugurated by physicians, but have been enthusiastically carried out. Venereal disease, phthisis and child welfare are all problems which he has grasped and is prepared to face, in spite of the fact that diminution in disease curtails his own revenue. All this has been done ungrudgingly and joyously, with expectation of no other return than a hazy consciousness of having contributed an atom toward's that condition whereby the individual is somewhat better prepared to withstand "the slings and arrows of outrageous fortune". Hence the ambition.

Finally, in the relation between state and physician, comes the question of education. Everyone recognizes the fact that the physical welfare and mental development of the child must be carefully looked after up to a certain point. This is excellent, but it stops too soon. By our present system, all children up to fourteen years of age are given or rather compelled to receive a stereotyped education regardless of heredity, natural inclinations, individuality or temperament—to fit them for useful citizenship. When the school education is completed the boy or girl is left to his or her own resources, to the mercy of parental judgment or the "fell clutch of circumstance". How can the pupil on entrance to the High School, satisfactorily decide the momentous question of his future or, indeed, why should such responsibility be thrust upon him? Parents are often of little help, for they recognize the responsibility of giving advice and usually maintain a discreet silence. Friends are more garrulous for they are not checked by the same onus, and the advice is based upon an inappropriate personal experience, consequently inapt and usually bad. To cross this rubicon which traverses the career of practically every boy, he should have the assistance of a specially appointed advisory vocational board. Some board acting "in loco parentis", in so far as the avocations are concerned, should exist, the personnel to include a physician, an educationist and an economist, and they would have before them a minute record of the boy's progress through the school. The physician would thoroughly investigate the boy's physical capacity and mental possibilities, while the economist would give advice as regards the demands or opportunities in any prospective occupation. By this arrangement the boy and his parents would have the consolidated advice of experts and be in a better position to decide intelligently upon a suitable calling.

2. *Relation to Colleagues.* Association with one's "confrères" will be either individual or collective, as in societies or associations. For years past, it has been well recognized that the convening of medical men has been of inestimable advantage. The exchange of opinions, the mooting of new ideas and the discussion of various problems, have solved innumerable difficulties; not only that, but meeting one's associates from time to time promotes a good fellowship which Dr. Johnson assures us can only be achieved by a good tavern. The secret of any society's success depends on the activity and the interest of each individual member. Better an organization of a dozen enthusiasts than one of fifty inerts. Broadly speaking, the greatest drawbacks to the modern association is the amount of dead wood it carries and the unjust criticism it receives. There is no greater stimulant to conscientious endeavour than the assured prospect of a full attendance and a sympathetic hearing. It is true that the recent international catastrophe which has overtaken the world has had its effect, even so remotely as on an obscure and distant medical association, but now that that is happily past, the opportunity is presenting itself to make our society a factor in medical life. It may be asked in what way can each individual member contribute anything towards this end. The answer is simple. Let everyone be indefatigable in attendance, take part in discussions after preparation, and by that I mean taking serious thought of the matter in hand, prior to the meeting, in order to present some new ideas; serve on committees, conscientiously assuming responsibility for the work entailed and, last but not least, boost the association and so act as to make it what an ideal organization should be.

In the relationship between the physician and his individual confrères there is nothing more appropriate than the application of the golden rule. The courtesy which he would desire one should be prepared to give and there are few callings in which so much of it may be required. No fault could be found with an honest difference of opinion courteously expressed and if in the right, no professional capital should be made from another's error. Speak well of one's colleagues in spite of petty differences so long as those differences are conscientious, honourable and based on ethics, for the belittling or maligning of an associate is undignified, pernicious and contemptible. Conversely, it is just as grave a breach to shield anyone whose practices are degraded and a disgrace to the profession.

As the evolution of medicine progresses, it is impossible for any one mind in a given time to master all the minutiæ. Consequently there is an ever-increasing tendency to specialism and a diminution in the numbers and skill of the general practitioner. This I think is to be deplored, not that I for a moment deprecate the value of specialists, but if every member of the profession restricted himself exclusively to one particular branch, the community would not be the best served. On the other hand if each practitioner, while engaging in general practice, would make himself proficient in one special department and refer other obscure cases to a suitable colleague, the profession as well as the laity would benefit immensely thereby. This procedure would naturally eventuate in a group system of medicine which by all appearances is not beyond the bounds of possibilities and as Hamlet would say, "A consummation devoutly to be wished."

3. *Responsibility for the Patient.* Of all the standpoints in the physician's career, none is more important than this. The patient comes to his physician in simple faith, trusting health and even

life itself to his hands. Implicitly and unhesitatingly he swallows deadly mixtures, takes hypodermics of the most powerful drugs and submits to be rendered unconscious, to have his very vitals investigated by surgical procedures in which the slightest mis-step might eventuate in death. All this, I say, he does with unquestioning confidence when his greatest asset is at stake. Would he do the same with a moiety of his capital? I think not. When it comes to a monetary investment, the most rigorous investigation is made into the proposition, to the possibilities of success, to the record of the promoters and frequently a guarantee of results is demanded. What a difference with the doctor: How frequently is he, the doctor, approached by a total stranger who will immediately consent to undergo a major operation upon being told of its advisability. Are we to infer from this that the average man values his worldly goods more than his health? No; but we can infer that the physician is trusted more than anyone else on earth. That trust is our birthright, inherited from the conscientious endeavour of generations of honest physicians passed away. What a noble heritage: "Be ours to hold it high" for it is an ancient privilege held only in trust, and bound are we to bequeath it untarnished to our successors.

Nothing inspires so much confidence as an active interest in and a thorough clinical examination of a patient. To accomplish this there should be a persistent endeavour to combat the constantly increasing tendency to resort to mechanical means of diagnosis. It is so easy to rush to the radiologist or the bacteriologist and expect a diagnosis forthwith, but that practice is pernicious. It is putting a responsibility upon them which it is not their duty to assume; it is unfair to a patient, in that abnormalities may be overlooked which can only be elicited by physical examination. It is unjust to one's self, for it establishes a careless habit highly detrimental to technical skill. No one will disclaim the position of the electrocardiograph, the microscope or other instruments as aids to diagnosis. The efficacy of such a procedure is obvious when one remembers that it is primarily the patient which should be treated and not merely the disease from which he suffers. Nor does treatment necessarily stop with the patient. Frequently the remaining members of the family, and often the friends as well, must come in for consideration and the physician in charge must be the dominating figure who will not allow himself to be importuned by the solicitations of relatives or stampeded by the opinions of friends.

Bearing in mind the famous aphorism of Hippocrates that if he can do no good, he should do no harm, the physician should beware of saying too much in a patient's hearing. There are so many people whose minds are poised on the precipice of morbidity that the slightest suggestion hurls them headlong into the abyss. Everyone has had the experience of examining a psychopath and seeing an area of hyperæsthesia extend *pari passu* with the progress of the examination. How often have neurotic adolescents and children been materially damaged by overhearing too much, or misunderstanding what is said to them. The least said to patients is the easiest explained away afterwards and the physician should not be expected to hold clinics with the friends on any case because he undertakes its care. On the other hand, I believe the patient, or in the case of a child, the parents should be entitled to a succinct opinion as to the condition and a briefer statement as to advice. This inspires infinitely more confidence and can the less readily be misconstrued than a garrulous dissertation destined to be impressive.

Furthermore the physician must constantly fight the eternal battle against medical freedom leagues, anti-vaccinationists, drugless healers, scientists, fakers and all other riff-raff of human degenerates who trade upon the credulity of an ignorant though suffering section of the community and who profit by the honourable reputation of a worthy profession. If the art of medicine with all its ancient traditions were to suddenly cease and the populace were dependent upon these charlatans, their survival would be of brief duration, for, on account of gross ignorance and brutality, they would be hounded out of a community as were the witches in the days of mediævalism, nor would it be a serious miscarriage of justice, if by the same method.

Unfortunately, certain of the inhabitants, through ignorance or lack of thought fail to differentiate between the true and the false and relying implicitly on the reputation of the physician, apply to quacks the same measure of credulity. For the protection of the public, for the preservation of our dignity and the peace of our immortal souls, it is essential that we combat this scourge by educating the ignorant, making the indifferent think and, by being ever on the alert, to adequately treat those psychogenetic unfortunates who are the peculiar prey of these designing sects.

Quite apart from the healing of disease, the physician holds a unique position in relation to his patients. In what one might call para-medical circumstances such as engaging nurses or procuring domestic help, solving the multiple problems of quarantine or coming to the rescue of friends and relatives in cases requiring restraint, the physician fulfills a useful function for which remuneration is seldom made. Frequently his advice is asked in matters of law, religion and finance, which unfortunately he is not always qualified to give, but he should be at least sufficiently well informed on extra-medical subjects as to indicate where the necessary knowledge may be obtained.

Lastly, there are the innumerable confidences which are repeatedly being thrust upon the medical attendant. He knows of domestic trouble, is familiar with family skeletons and is frequently the repository of individual secrets which he must never divulge. All this is as it should be, since a thorough knowledge of the human mind is as essential to the satisfactory treatment of disease as is that of the body itself. But it imposes upon the doctor an extra burden of responsibility, for such trusts he must never betray nor use for personal advantage.

4. *Duty to One's Self.* The first duty of the physician in the art of medicine is to succeed. One might ask, what is success? It has been defined thus:

> "He has achieved success who has lived well, laughed often and loved much; who has gained the respect of intelligent men and the love of little children; who has left the world better than he found it, whether by an improved poppy or a perfect poem; who has filled his niche and accomplished his task; who has never lacked an appreciation of beauty or failed to express it; who has always looked for the best in others and gave the best he had; whose life was an inspiration and whose memory a benediction."

A rather comprehensive definition, but the part which I think applies most admirably to the physician is the clause, "Who has filled his niche and accomplished his task." Not the acquiring of fame, the gaining of eminence, the accumulation of wealth, or the achieving of social or political prominence is the particular niche which he is called upon to fill, but rather the daily task of curing expeditiously those patients who can be cured, of improving those capable of improvement and of mitigating the suffering of those whose course is run and whose demise is inevitable. When one is so intimately associated with human emotions, sees patients who are frequently friends pass through various phases of suffering, sorrow, courage, perseverance, ill-supported hope and the harrowing premonitions of impending dissolution, one is prone to become less of the trained expert and more of the virile human being whose own emotions vibrate in sympathy with those in trouble. Here the physician owes a duty to himself. Since his daily routine makes such demands, he must never abandon a rational viewpoint, lose his perspective, or fail to maintain an equipoise in judgment which is in keeping with that dictatorial position rightfully belonging to him.

Again, the physician owes a duty to himself in the matter of recreation. If he is to keep himself physically and mentally fit, to enable him to cope with the problems which are daily confronting him he must have his regular hours of relaxation and his annual holidays of sufficient length to permit a thorough mental rest and rejuvenation.

Work of such an exacting nature as that of the physician is well worthy of adequate remuneration, but there is a vast difference between this and mercenary gain. There is no greater offence than that of subjecting a credulous patient to spurious and unnecessary treatment for mere monetary compensation. It is worse than the work of the bandit and profiteer. When a physician resorts to such a procedure he screens himself with a mask of respectability, betrays a confidence and brings into disrepute a calling which, in the main, has stood for centuries, unblemished before the world. On the other hand, it is just as imperative that for genuine service just recompence should be made, and seldom is the doctor adequately remunerated. How often will the timely administration of quinine, antitoxin or salvarsan save a life, for which service a few paltry dollars are paid. The iniquity of this dole is emphasized by the fact that should the doctor happen to be assessed damages, lives are valued in the thousands. At any rate, it should be demanded that legitimate accounts be paid. The laity value service at what it costs and the sooner they are educated to the fact that medical services are more valuable than rubies, the better it will be for them, for the profession and the community in general. Without being tarred by the brush of commercialism the physician should be methodical, punctual and emphatic about his accounts. Were I a member of the laity I would be suspicious of a doctor indifferent to his ledger, for I could not help but feel that he would be slovenly in his therapeutics. I could imagine his desk which, I think, is frequently a replica of a brain, laden with a jumble of unanswered correspondence, bills payable and unanalysed urinary specimens. If he were more business-like in his book-keeping, there would be fewer doctor's deadbeats, prompter settlements by everyone and an ever diminishing number in that army of wild-cat stock vendors, financial fakirs and confidence men, all of whom look upon the profession generally as their own peculiar, legitimate and easy prey. Were it made an unalterable rule that such interviews were granted only after satisfactory introductions such as any astute financial man would demand, the profession might eventually be relieved of these annoying distractions and I am sure of an ever increasing overdraft.

It is not given to everyone in the profession, either by nature or achievement to acquire immortal fame. The spheres of some few are international in extent, those of a few more are urban, but the vast majority live, labour and die, are loved or hated, revered or maligned, in a very limited field, but no place is so restricted as to preclude opportunities. They recur in the daily routine, in the most exacting monotony or in the homes of the poorest patient. To cheerfully shoulder the burdens of the day, to inspire the unfortunate and cheer the depressed; to encourage the hopeless and relieve the suffering; to meet sorrow and disappointment with courage and fortitude becoming a man; to speak well of one's neighbour and forgive his short comings; to cultivate a geniality of soul, a broader vision and a tolerance of others' opinions; these are the opportunities which are knocking daily at the door. The true physician, indifferent to personal advantage, comfort or remuneration, seizes each one with the welfare of patient and profession, at heart. By so doing, he adds his mite to the ennobling of his calling. May it be given to us so to practise that when our allotted span of life is run, and we feel the touch of the grim destroyer summoning us to that mysterious abode from whence no traveller has returned, to that profound slumber, from which the awakening is unknown, may each one of us in all verity be enabled to exclaim, "I have filled my niche and accomplished my task."

TO THE MEDICAL PROFESSION OF CANADA:

If you are requiring an assistant or planning a holiday this summer, or a few weeks off to brush up, or possibly a honeymoon, the services of a recent graduate, or a senior student in medicine, might be desired. The student body of the province of Ontario is being canvassed with reference to summer work

Should you consider utilizing one of the men available, please forward full particulars to the Secretary of the Ontario Medical Association, at 127 Oakwood Avenue, Toronto, making note of the following:

This year's graduate, or senior student;
When required;
For how long;
Assistant or *locum tenens;*
Must he be able to drive car;
Remuneration;

and any other information which will facilitate the confluence of supply and demand.

A large number of senior students already has made application for positions.

A RESUME OF DIABETES MELLITUS

R. W. Mann, M.D.

Toronto

BEFORE entering on this brief discussion of what diabetes is, and its treatment, it may not be amiss to review hurriedly the basic facts of carbohydrate metabolism, as without some familiarity with them we cannot adequately appreciate the clinical problem of this disease.

The free starch not surrounded by a cellulose envelope is acted upon first by the enzyme ptyalin of the saliva during mastication, and for a short time after its arrival in the stomach. Entering the intestine, a more powerful enzyme amylopsin, quickly hydrolyzes the remaining starch and the product of both enzymes is maltose. Here also inverting enzymes, maltase, lactase, and invertase, act upon the sugars maltose, lactose and cane sugar, with the end result of glucose, galactose and levulose.

These sugars are carried to the liver by the portal circulation and there converted readily into glycogen (glycogenesis) and stored as such. Subsequently, the glycogen breaks down, yielding only glucose (glycogenolysis). The normal level of glucose in the blood is 0·07 to 0·15 per cent. and in healthy individuals is maintained desperately at this constant percentage, even starvation affecting it but slightly. From the blood, glucose is taken up by the tissue cells and utilized or may be stored as glycogen, especially in the muscles. The burning of sugar occurs from changes through a series of complex substances, and finally water and carbon dioxide result With abundant carbohydrate to satisfy body demands, and glycogen reserve adequate, sugar is further stored as fat, the change likely occurring in the fibrous tissue. If the carbohydrate supply in food is deficient or absent, the glycogen reserve is quickly used up and then sugar is formed from protein (glyconeogenesis). This may be either from the food or from the body proteins.

Sugar introduced into the body parenterally is partly built up into glycogen, partly burned, and partly converted into fat, the body cells having a marked capacity for handling glucose.

In normal animals it is impossible to produce a glycosuria by feeding excessive amounts of starch. Even when sugars are fed in conjunction with other food, glucose seldom appears in the urine. Experience shows that in human beings tolerance for ingested sugar is doubled by giving it with a meal, hence retarding its passage into the duodenum; but if much sugar is taken into an empty stomach, rapid absorption occurs and sugar soon appears in the urine. The individual tolerance for sugar varies considerably, but the average normal individual may take 120 grams of glucose without producing a glycosuria.

If sugar absorption is slow, it nearly all reaches the liver and is there changed into glycogen. If given rapidly, some of it passes through the liver unchanged, and reaches the general circulation in this form. It is probable that a small amount regularly passes unchanged thus to the circulation, either by the liver failing to retain it, or else by way of the thoracic duct.

With these fundamental facts in mind we may turn to the question, what is diabetes? Joslin defines it as "a disease in which the normal utilization of carbohydrate is impaired, in consequence of which glucose is excreted in the urine". This should be supplemented by adding also that it is a deficiency of the internal secretion of the pancreas.

Like tuberculosis, it has been known from the earliest times, Aretæus leaving a classic record of the symptoms in the first century. Apart from the taste and smell of the urine, however, little was known until the time of Paracelsus, in the sixteenth century. Dobson, in 1776, demonstrated sugar in the urine, while Rollo, in 1797, wrote an excellent account of it and recommended a meat diet. Our own knowledge of the disease began with Bernard's investigation (1847) in which he demonstrated the origin of blood sugar and definitely connected diabetes and carbohydrate metabolism. He, it was, who named the antecedent of blood sugar, *glycogen.*

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With a flexible catheter passed through an opening in the jugular vein down to the right heart, he proved that sugar was added to the blood between the femoral vein and the right heart Later, passing this tube through the heart and down to the level of the hepatic vein, he found blood comparatively rich in sugar, thus linking up its origin to the liver.

Early English and French clinicians had observed atrophy of the pancreas in some cases and attempts were made upon animals to remove it, but all met with failure. It was not until 1889 that Minkowski and Von Mering succeeded, and showed that complete removal of the pancreas resulted in the most severe type of diabetes. Sandmeyer, in 1895, produced delayed diabetes by partial pancreatectomy with ligation of the duct. The animals thus treated do not at first become diabetic, but as the remaining portion of the gland degenerates, glycosuria develops and ultimately, due to atrophy, the same condition supervenes as when the whole gland is removed at once. It was not for many years later that the idea occurred to investigators to study weakness of pancreatic function, by removal of a portion only of this organ, leaving the remnant's blood supply and duct communication with the intestine intact. This was done in four places at the same time, all being ignorant of the other's work, viz.: by Thiroloix and Jacob, Helly, Allen, and Homans.

Allen showed that nine-tenths pancreatic removal in dogs may produce acute diabetes, while seven-eighths or less removed may give rise to a gradual onset. Some of the dogs may be kept for months on a diet within their tolerance without glycosuria, but if this is exceeded, permanent and fatal diabetes results. This analogy is regularly seen in human beings who go along satisfactorily for months, and then, by a dietary indiscretion, precipitate a much graver form of the disease.

Individual factors show also in dogs, as with identical fractions of pancreas removal, and exactly controlled conditions, one goes rapidly downward in an intense form of the disease, while the other does well.

By injecting sugar into normal animals over long periods of time so that their blood sugar is kept much higher than that of totally depancreatized animals, it has been shown that their wounds heal better and cachexia is not so apparent. This proves that diabetes is a specific disorder of nutrition in which all the body tissues have a lowered ability to withstand infection or repair injury. In human beings this is evidenced in cataract, retinitis, neuritis, pyogenic infections and tuberculosis.

The origin of the internal secretion of the pancreas is in the islands of Langerhans which undergo very characteristic changes in the experimental animals, as shown by Opie, Allen, and Mallory. These changes, Allen believes, have their parallel in human cases and are demonstrable when sufficiently careful technique and search are employed. The lack of this pancreatic secretion occasions an increased production of sugar, and a loss of the power of the tissue to utilize it. The carbohydrates are not stored in the form of glycogen and are not readily dissociated in the tissues to supply energy. Whether this inability to utlize sugar resides in the tissues themselves or in some alteration in the sugar presented to them remains undetermined. This inability to use sugar is of primary importance, as the hyperglycæmia, the glycosuria, the glycogen depletion, and the increased glyconeogenesis are in response to a constant demand of the tissues for more sugar which they cannot use.

In addition to weakened pancreatic function, glycosuria may be caused by other conditions, none of which, however, have any semblance experimentally to diabetes mellitus. Injection of adrenalin solution produces glycosuria which persists as long as this substance is present in the blood. In dogs whose adrenals have been removed, and in Addison's disease, there is a low blood sugar and increased tolerance for sugar, and adrenalin injections do not produce a glycosuria. McLeod and Pearce showed that hyperglycæmia is produced by splanchnic stimulation, but that this does not occur if the adrenals are removed or the liver denervated. Cannon finds emotional states, such as fear, accompanied by increased adrenalin secretion and occasionally by glycosuria.

Hyperthyroidism is nearly always associated with a lowered carbohydrate tolerance, indeed, this is one of our tests for this disease. Hypothyroidism, on the other hand, has greatly increased sugar tolerance. Falta claims that if the range of pancreatic function be stronger, the thyroid action will be slight and will have little influence on carbohydrate metabolism, while if this function is weak the thyroid action will be easily asserted.

Injections of extracts of hypophysis cause glycosuria. The German investigators have claborated a very fascinating theory in which the pancreas and parathyroids depress carbohydrate metabolism, while the adrenals (and chromaffin system), thyroid and hypophysis facilitate the mobilization of sugar. Hence weakness of one set allows overactivity of the opposing set. While this explains many interesting facts regarding this complex disease, and while the endocrine glands are associated in a very complex way, yet other facts cannot be fitted into this scheme and their discussion here would involve too much time.

I should like to refer, in passing, to what is known as absolute diabetes, an extreme grade of severity in which a patient cannot utilize any carbohydrate taken with the food or any sugar derived from protein metabolism. Since fat cannot be converted into sugar, any glucose excreted must be derived from carbohydrate or proteid in food, or from protein of the body tissues. Each gram of nitrogen excreted in the urine represents the decomposition of 6·25 grams of protein. Hence in a starving diabetic any sugar excreted must come from tissue protein. Experimentally, we know that each 6·25 grams of protein taken into the body as food yields 3·65 grams of sugar, or 58 per cent. of the molecular complex. Hence a starving diabetic who is excreting 3·65 grams of sugar for each gram of nitrogen excreted, is said to be an absolute diabetic. This is the D:N. (dextrose-nitrogen) ratio. Such a patient cannot utilize any sugar, not even that derived from tissue protein. In such cases the patient's energy comes entirely from fat and those parts of the protein molecule not converted into sugar. This was formerly called the "fatal ratio", by Lusk, but a few cases have recovered some degree of sugar utilization.

The marked derangement of fat metabolism in diabetes is indicated by the large amount of fat in the blood, the plasma at times acquiring a creamy hue. This abnormality is regarded as secondary to the disordered carbohydrate metabolism as the "fats can burn only in the fire of carbohydrates". The obesity which precedes glycosuria in a considerable proportion of cases is explained as the result of fat formation from carbohydrate, which the organism is no longer able to burn. In some unknown way the B-oxybutyric acid of fat decomposition requires the concomitant burning of sugar, and in diabetes these acid bodies accumulate and upset the acid base equilibrium, causing the serious and dangerous group of symptoms known as acidosis. Our tests for this condition are the ferric chloride or nitroprusside tests of the urine, and the CO_2 of alveolar air, as well as of course the clinical evidence of sweet breath, languor, dyspnœa, etc.

The use of alkalies to combat this acidosis or lack of alkali reserve has not been very successful. Just why this is so, is not clear, but Joslin, Allen and Geyelin have all discontinued its use some time ago. Reliance is placed rather upon discontinuance of fat first of all, then fasting, drinking freely of liquids, and, if necessary, giving some carbohydrate for a day or two and again fasting. Geyelin has noted that it sometimes clears up when the caloric value rises sufficiently.

Ætiologically, the dominant factors in diabetes mellitus may be briefly enumerated thus,—

1. Hereditary or familial tendency.
2. Obesity and dietary excesses.
3. The strenuous life.
4. Nervous excitement and anxiety.
5. Infections.
6. Trauma of operations with possible interference with the normal action of pancreas and liver.
7. Arteriosclerosis.
8. Syphilis.
9. Thyroid disease.
10. Acromegaly.
11. Gout.
12. Bright's disease.

For the diagnosis of diabetes, probably the best single test is fermentation of the suspected sample, thus proving the presence or absence of glucose. This should always follow the discovery of a reduction of the copper solution. In collecting the urine for this test the customary single morning sample is the least satisfactory possible, as in the early or very mild cases glucose appears only transiently after meals. Hence, secure in addition an evening sample, or a specimen one and a half to three hours after the heaviest meal of the day. Such a sample is often a better means of detecting a little albumen or a few casts. Still better, of course, would be a mixture from a twenty-four hour sample. Finding glycosuria, next proceed to examine the blood sugar. With slight clinical symptoms a glucose tolerance test should be employed and this consists in examining the fasting blood sugar, then examining the blood sugar and urine, one-half, one hour, and two hours, after the ingestion of 100 grams of glucose. There is a normal rise in health and a greater rise and slower decline in diabetes. This serves also to eliminate a class of cases called "renal diabetes" who, while having a persistent small amount of glucose in the urine, have a blood sugar which behaves normally, are able to utilize sugar perfectly, and have no other clinical sign of diabetes. Such cases are rare, however, and until proven otherwise, are better to be treated as diabetes. The following table illustrates such a tolerance test.

Glucose Tolerance Test

W. S. K., April 16th, 1920. Present diet—CH 175 gms, P 100 gms, F 150 gms, calories 2350 per diem.

Blood sugar—0·96 per cent. (fasting).
" " —0·136 per cent. 1 hour after 100 grams glucose.
—10.00 a.m.—100 grams of glucose given in coffee.
Urine—10.30 clear, acid, 1012—no sugar, no diacetic acid.
Urine—11.30 a.m. clear, acid, 1018—sugar, 0·7 per cent., no diacetic acid.
" —12.00 a.m. clear, acid, 1013—no sugar, no diacetic acid.

In connection with blood sugar we should remember that the percentage is increased after exercise but also, that the tolerance for sugar is greater in both normal and diabetic cases after muscular effort.

Finding the urine sugar free in a known diabetic is not alone a sufficient guide, since the blood sugar level may have become raised. Mild diabetes complicated by a nephritis presents this problem, since with the advance of the nephritis, the permeability of the kidney becomes less, and glucose is excreted with more effort.

The history of diabetic therapy has consisted mainly of two principles:

1. The restriction of sugar-yielding foods, carbohydrate and protein.

Case Note No. 1 W. S. K., came complaning of frequency of urination, great thirst, and some insomnia for three months. His family history was negative. He is a lumberman and while in charge of his men in the Maine woods, lived over a small store, in passing through which he was constantly eating candy, and wanted more and more sugar in his food, as well as using maple syrup freely. He readily conformed to diabetic discipline and did very well, as his chart shows. Blood pressure 125–90, hæmoglobin 90 per cent.

W. S. K.—Age, Forty-five.—Height, 5′ 10″

Date	Vol. c.c.	Sp. Gr.	Reac.	Alb.	Acetone	Diacetic Acid	Sugar in Urine	Diet in Grams					Weight Lbs.	Blood Sugar %	Blood CO_2 mm. Hg.	Alveolar air CO_2 mm. Hg.
							Reduction %	Carbohydrate	Protein	Fat	Alcohol	Calories				
1919																
April 30.	2000	1040	ac.	–	–		5.	Ordinary diet					191	..	..	..
May 1.	2500	1040	"	–	–	–	2.5	"	"	"			..	..	..	..
" 2.	3500	1018	"	–	–	–	2.5	"	"	"			189½	0.15	..	..
" 3.	4200	1015	"	–	–	–	1.	"	"	"	less fat		..	..	..	..
" 4.	4000	1015	"	–	–	–	1.1	"	"	"	"		..	..	..	..
" 5.	3700	1015	"	–	–	–	1.2	Take ordinary diet, but no fat, no sugar, and halve the carbohydrate					..	..	..	..
" 6.	3500	1016	"	–	–	–	1.						..	..	..	..
" 7.	3500	1009	"	–	–	–	0.25	30	30	30	–	510	184½	..	..	..
" 8.	3000	1015	"	–	–	–	–	30	50	30	–	640	..	0.12	..	..
" 9.	3000	1012	"	–	–	–	–	35	60	50	–	830	182	..	..	..
" 10.	3200	1012	"	–	–	–	–	35	60	50	–	830	..	..	..	..
" 11.	3500	1015	"		–	–	–	35	60	50	–	830	..	..	..	..
" 12.	3400	1012	"	–	–	–	–	18	30	25	–	415	..	..	..	..
" 13.	3000	1016	"	–	–	–	–	35	60	50	–	830	..	..	..	..
" 14.	2800	1012	"	–	–	–	–	36	81	75	–	1143	181½	..	..	..
" 15.	2500	1015	"	–	–	–	–	36	81	75	–	1143	..	..	..	..
" 16.	2000	1020	"	–	–	–	–	40	90	110	–	1510	181	..	..	..
" 17.	2500	1018	"	–	–	–	–	40	90	110	–	1510	..	..	..	..
" 18.	2400	1015	"	–	–	–	–	20	45	55	–	760	178	..	..	..
" 19.	2800	1015	"	–	–	–	–	45	90	110	–	1530	..	0.11	..	..
June 25.	reached		"	..	..	..	..	175	110	150	–	2490	163	0.12	..	..

2. The cutting down of the total caloric value of the intake.

Willis early instituted a bread, milk, and barley-water cure. This diet probably had other objects in view but under-nutrition was achieved. Rollo suggested animal food and in this way carbohydrate restriction was accidentally discovered. The excessive use of protein and fat showed itself, and fast days were introduced. Von Noorden introduced his oatmeal cure and it was thought to have special properties until Blum declared it to be like any other form of starch. The vegetable and green days associated with it gave under-nutrition, and no doubt contributed to its popularity. Allen as a result of his elaborate experimental studies and experience with human cases, insisted that as the disease is the result of a weakened assimilative function, the only way to help it is by lightening the total caloric load, in addition to limitation of carbohydrate.

The principles guiding us are in a general way:

1. To render the urine sugar free.
2. To reduce the blood sugar to normal.
3. To avoid acidosis.
4. To maintain the patient's health and strength.

The patients are cautioned to make no variation in their diet until a twenty-four hour sample of urine has been obtained and examined, blood sugar, and CO_2 estimated, unless serious acidosis is manifest or impending. The fats are then eliminated for a day or two, and either a closely restricted diet or fast is commenced, suddenly or gradually, as conditions warrant, until the urine is sugar free and fasting blood sugar is normal. Then beginning with low caloric values, a very gradual increase is instituted, observing weekly half days or fast days. The weakened assimilative functions are thus rested, and gradually called into activity again. With the drop in body weight, there is a marked drop in caloric

CASE NOTE NO. 2. W. J. W., came for relief of lack of energy, thirst, frevent urination, and loss of weight extending over a period of two months. He is a carpenter, or rather a carpenter's helper. Blood pressure 145–95, hæmoglobin 90 per cent. He had some oral sepsis, and his tonsils were considerably enlarged. There was a slight mitral systolic murmur, but the apex was normal in position. Physical examination of the heart, lungs and abdomen was otherwise negative. Family history negative. In spite of being of very poor education, with patience, he grasped the principles of food values, the weighing of his own food, made a good recovery and has been carrying on ever since.

W. J. W.—Age, Thirty-eight.—Height, 5′ 10″

Date	Vol. c.c.	Sp. Gr.	Reac.	Alb.	Acetone	Diacetic Acid	Sugar in Urine	Diet in Grams					Weight Lbs.	Blood Sugar %	Blood CO_2 mm. Hg.	Alveolar air CO_2 mm. Hg.
							Reduction %	Carbohydrate	Protein	Fat	Alcohol	Calories				
1919																
Oct. 24.	1041	1011	Ac.	–	+	+	3.8	Ordin	ary di	et		?	139¾	..	..	..
" 25.	922	1038	"	–	+	+	1.5	"	"	"		?	"	0.19	..	30
" 26.	1520	1028	"	–	+	+	1.	33	27	0.6	–	252	138	..	..	..
" 27.	1456	1010	"	–	–	–	0.4	Starv	ation			..	137	..	..	..
" 28.	1500	1013	"	–	–	–	–	15	30	33	–	501	135½	0.11	..	..
" 29.	1550	1011	"	–	–		–	21	41	60	–	788	134½	..	..	..
" 30.	1800	1012	"	–	–	–	–	35	60	100	–	1320	133½	..	..	..
" 31.	2860	1015	"	–	–	–	–	45	63	120	–	1570	134	..	..	..
Nov. 1.	2460	1015	"	–	–	–	–	46	70	128	–	1672	134	..	..	..
" 2.	3130	1012	"	–	–	–	–	62	74	138	–	1821	..	..	..	..
" 3.	....	....	"	–	–	–	–	Starv	ation	day		..	..	..	..	..
" 4	3120	1012	"	–	–	–	–	60	75	140	–	1800	..	0.11	..	..
" 5.	2800	1012	"	–	–	–	–	65	75	140	–	1900	..	..	..	..
" 6.	1730	1014	"	–	–	–	–	75	80	150	–	1970	133	..	..	..
" 7.	2300	1016	"	–	–	–	–	85	80	160	–	2100	..	..	..	..
" 8.	2370	1015	"	–	–	–	–	100	80	160	–	2160	134	..	..	..
" 9.	2800	1014	"	–	–	–	–	115	80	160	–	2220	..	..	..	..
" 10	2640	1014	"	–	–	–	0.6	125	80	175	–	2468	134½	..	..	..
" 11.	2570	1012	"	–	–	–	0.25	100	80	175	–	2368	..	..	0.14	..
" 12.	2740	1016	"	–	–	–	–	Starv	ation	day		..	..	..	..	..
" 13.	2800	1013	"	–	–	–	–	50	75	150	–	1850	133½	..	..	..

requirements, and at the same time a rise in the tolerance. The diet contains protein to protect the body nitrogen, carbohydrate to prevent any serious acidosis, but is deficient in fat to compel burning of the body fat, and thus reduce the caloric needs.

Some time ago Mosenthal, in interesting studies, pointed out the value of protein in the diabetics' diet, and the importance of adequately using it to maintain the body nitrogen. Recently Allen has again called attention to this point and outlines five guiding principles in planning diets after fasting.

1. Begin with low total calories and increase gradually.
2. Protein is the most important food.
3. Protein tolerance is greatest when other foods are excluded.
4. The caloric requirements fall with the body weight.
5. The tolerance rises as the weight of the body falls.

"Under any conditions the ultimate criterion of the severity of diabetes is the level of the diet, and the body weight, which can be endured without return of symptoms."

It is surprising at times to note the improvement of tolerance after weeks or months of careful dieting. We aim to establish a diet of at least 1500 to 2000 calories, roughly consisting of 1·5 to 2 grams protein per kilo of body weight, 100 to 150 grams of fat and a carbohydrate value at least 30 per cent. below their limit of tolerance determined by testing out, with the diet, the point where glycosuria occurs. Mosenthal finds an ultimate diet of equivalent amounts of fat and proteid most palatable for prolonged feeding.

A rapid grain in weight, especially during the very low diet or starvation, should cause search for œdema. This may occur very suddenly and be quite extensive. Comparison of the fluid intake and output will show a retention of fluid. It is believed to be due to salt retention following the free use of it on thrice cooked vegetables or in broths. The œdema retains sodium and potassium salts in the blood and

Case Note No. 3 C. H. H., came under observation having a history of glycosuria five years ago, and now complained of occasional nausea, itchiness of the skin, and some headache. Five years ago following hæmorrhage into the right eye, glaucoma developed, requiring operation. He had slight tonsillar infection, and some hypertension, his blood pressure being 175–100. His family history was negative, but he used sugar to excess, previous to five years ago. He made good progress and has since been able to maintain the conditions noted below.

C. H. H.—Age, Sixty-three.—Height, 5′ 9″

							Sugar in Urine	Diet in Grams								
Date	Vol. c.c.	Sp. Gr.	Reac.	Alb.	Acetone	Diacetic Acid	Reduction %	Carbohydrate	Protein	Fat	Alcohol	Colorics	Weight Lbs.	Blood Sugar %	Blood CO_2 mm. Hg.	Alveolar air CO_2 mm. Hg.
1919																
Feb. 22.	?	1033	Ac.	–	–		3.3	Ordin	ary				163½	..	..	..
" 23.	?	1032	"	–	–	–	3.3	Ordin	ary				..	0.23	..	..
" 24.	1372	1021	"	–	–	–	0.75	80	29	–	–	487.9	..	..	..	..
" 25.	2268	1019	"	–	–	–	0.55	70	30	–	60	584	162	..	..	..
" 26.	2352	1011	"	–	–	–	0.3	–	45	50	60	823.5	161½	..	..	..
" 27.	2632	1012	"	–	–	–	trace	22	3	4	60	310	..	..	..	..
" 28.	1800	1015	"	–	–	–	–	–	–	–	60	174	..	..	..	..
" 29.	4000	1012	"	–	–	–	–	–	–	–	60	174	160¼	0.14	..	..
Mar. 1.	3810	1020	"	–	–	–	–	20	30	50	60	803	..	..	..	..
" 2.	3500	1015	"	–	–	–	–	30	50	50	60	844	..	..	..	..
" 3.	4480	1010	"	–	–	trace	–	35	60	50	60	1028.5	..	..	..	..
" 4.	2044	1009	"	–	–	"	–	40	70	50	60	1090	157	..	..	..
" 5.	3640	1007	"	–	–	faint trace	–	60	50	75	60	1322	..	..	..	..
" 6.							–	75	50	75	100	1500	..	0.12	..	..
" 8.	2856	1010	"	–	–	–	–	75	60	125	60	1890	157½	..	..	..
" 9	1400	1009	"	–	–	–	–	100	60	140	60	2132	..	..	..	..
" 10.	2940	1007	"	–	–	–	–	105	65	140	60	2173	158½	0.12	..	..
" 11.	1904	1008	"	–	–	–	–	..	..	..	..	..	..	..	..	..

helps probably, in maintaining the acid-base equilibrium.

High fat feeding was undoubtedly the cause of much of the diabetic coma formerly. In the Presbyterian Hospital in New York, Geyelin reports the cases over two four year periods under new and old methods of treatment. The deaths under the newer method were 11 per cent. and the older 21 per cent. Coma caused death in 25 per cent. of the cases of the last four years, while it accounted for 66 per cent. in the preceding four years. The initial fast and lowered fat feeding are regarded as the chief causative factors of this change.

It is important to teach the patients the intelligent understanding of their own cases in the way of its pitfalls and the absolute necessity of strictly adhering to diet. To this end it is essential to have them for a considerable period under a surveillance, in which they are taught to accurately weigh their own food, compute the elements of their own diet, test their own urine for sugar and diacetic acid, and thus relieve the tedium of the "cure". They must realize that they are not normal people, and must learn to regulate their activities according to their caloric intake.

Overeating is a common fault in these modern days and by reference to the accompanying chart this overeating is frequently in the form of extra foods taken apart from meals, at afternoon teas, after the theatre, or in warm weather at the soda fountain. You will note the not inconsiderable caloric values easily consumed at such times. In addition many people indulge in these accessories of diet to excess, thus taking on a comparatively fasting stomach foods containing a high percentage of sugar. As I have already

Case Note No. 4. Mrs. J. H., came with a history of glycosuria of one month's duration, but with symptoms suggestive of having had the condition for four months. She is a distinctly neurotic type and a life-long worrier. January, 1919, she suffered from a marked neuritis of the left upper extremity which she herself associated with having eaten six pounds of candy, and a lot of raisins during the Christmas week, 1918. She had no other previous illness of moment, and the family history was negative. Blood pressure 130–75, hæmoglobin 95 per cent. She was a difficult patient from the start, promising adherence to discipline and being constantly detected in deception. She could not afford hospital supervision and by constantly breaking discipline could make no progress with her case.

Mrs. H.—Age, Thirty-eight.—Height, 5′ 2½″.—Highest weight, 110 pounds. (June, 1919)

Date	Vol. c.c.	Sp. Gr.	Reac.	Alb.	Acetone	Diacetic Acid	Sugar in Urine	Diet in Grams					Weight Lbs.	Blood Sugar %	Blood CO_2 mm. Hg.	Alveolar air CO_2 mm. Hg.
							Reduction %	Carbohydrate	Protein	Fat	Alcohol	Calories				
1919																
Jan. 3	?	1012	Ac.	–		–	0.5	Ordin	ary d	iet		?	89	..	..	..
" 4	3000	1012	"	–	–	–	0 25	"	"	"		?	..	0.2	..	35
" 5.	2800	1012	"	–	–	–	faint	16	72	58	–	874	..	..	..	..
" 6	2800	1015	"	–	–	–	–	16	72	58	60	1048	..	..	..	..
" 7.	2860	1015	"	–	–	–	–	16	72	58	60	1048	..	0.15	..	..
" 8.	2850	1015	"	–	–	–	–	16	72	58	60	1048	..	..	..	
" 9	1800	1025	"	–	–	–	1.	20	70	50	60	981	..	..	..	.
" 10.	3000	1014	"	–	–	–	–	Starv	ation	day			90	..	..	
" 11.	4000	1012	"	–	–	–	–	15	30	30	60	624	..	..	..	.
" 12.	4500	1012	"	–	–	–	–	15	30	30	60	624	..	..	..	.
" 13.	3500	1012	"	–	–	–	0 25	15	30	30	60	624	..	0.16	..	..
" 14	3010	1015	"	–	–	–	–	Starv	ation	day		?	90	..	..	..
" 15.	4060	1016	"	–	–	–	–	15	30	30	60	624	..	..	..	..
" 16.	4080	1018	"	–	–	–	–	15	30	30	60	624	..	..	..	..
" 17	3560	1016	"	–	–	–	–	15	60	40	60	834	91	..	..	..
" 18.	3250	1015	"	–	–	–	0 25	15	60	40	60	834	..	..	..	..
" 19.	3500	1016	"	–	–	–	–	Starv	ation	day		?	..	..	..	..
" 20	3750	1015	"	–	–	–	0.25	15	30	30	60	624	91	..	..	..
" 21	3700	1012	"	–	–	–	0 25	Starv	ation	day		?	..	..	..	..
" 22	3680	1011	"	–	–	–	–	15	30	30	60	624	..	..	..	..
" 23	3750	1012	"	–	–	–	–	15	60	40	60	834	90¾	..	..	..

noted this is particularly harmful to a weakened pancreatic function, as recently proven by Allen experimentally upon partially depancreatized dogs.

The Energy Content of Extra Foods (Benedict)

	Cost.	Calories.
Peter's Chocolate	.10	220
Lowney's Milk Chocolate	.06	321
Walter Baker's Vanilla Chocolate	.05	581
Park & Tilford's Chocolate	.10	641
Lady Fingers—one	–	68
Macaroon—one	–	42
Graham Wafer—one	–	44
Oatmeal Cookie—one	–	45
Chocolate Ice Cream Soda	.15	467
Maple Walnut Sundæ	.15	419
Chocolate Ice Cream Cone	.05	132
Ginger Ale	.15	136
Grape Juice	.19	315

Just a word regarding the diabetic as an operative risk. Unless it is a case of great urgency, a preliminary course of dieting should be undertaken, to reduce the blood sugar to normal level and free the urine from glucose. Thus treated, there is an enormous improvement of their capacity for wound healing and the avoidance of infection. Ether is not the anæsthetic of choice, since the blood-ether mixture seems to dissolve a considerable amount of fat from the tissues and certainly gives rise to marked hyperlipæmia, as shown by Bloor as well as by Sansum and Woodyatt, quoted by Fitz in his interesting article. At the same time, it causes the glycogen of the liver to break down, resulting in hyperglycæmia. There is, likewise, a temporary sup-

Case Note No. 5. J. H., this patient, a railway engineer, gave a history of great weariness and weakness, marked loss of weight, paræsthesia of the lower extremities and great thirst gradually developing for a period of two years. In August, 1917, his gall bladder was opened and the appendix removed. April, 1919, he had many septic teeth removed. He presented marked evidence of tonsillar infection and his tonsils were removed October 28, 1919, by Dr. Goldsmith. Family history negative. Blood pressure 130–95, hæmoglobin 90 per cent. Physical examination of the heart and lungs was entirely negative. He ultimately made little or no progress, but one month ago was still alive but somewhat weaker. He constantly worried over his unemployment, and during the time he was under treatment his mother died. This is one of the unfavourable cases where the disease has been in existence for considerable time and in which the outlook is very poor.

J. H.—Age, Thirty-nine.—Height, 5′ 7″.—Highest weight, 170 pounds (two years ago)

Date	Vol. c.c.	Sp. Gr.	Reac.	Alb.	Acetone	Diacetic Acid	Sugar in Urine	Diet in Grams					Weight Lbs.	Blood Sugar %	Blood CO$_2$ mm. Hg.	Alveolar air CO$_2$ mm. Hg.
							Reduction %	Carbohydrate	Protein	Fat	Alcohol	Calories				
1919																
Oct. 2.	7500	1025	Ac.	trace	–	–	3.5	Ordinary diet				?	121	0.32	..	40
" 25.	2000	1014	"	–	–	–	–	15	30	30	60	624	116¼	0.15	..	35
" 26.	2520	1013	"	–	–	–	–	16	53	38	60	788	..	..	..	..
" 27.	2500	1015	"	–	–	–	1.2	20	70	50	60	984	116	(Pus in tonsils, left tonsil removed)		
" 28.	2800	1012	"	–	–	–	0.25	15	30	30	60	624	115½	..	..	..
" 29.	3000	1017	"	–	–	–	–	15	50	50	60	884	..	..	..	..
" 30.	2520	1012	"	–	–	–	–	15	50	50	60	884	..	..	..	..
" 31.	2800	1014	"	–	–	–	–	20	55	75	60	1179	115¾	..	..	..
Nov. 1.	..	..	"	–	–	–	–	Starvation day					..	..	..	..
" 2.	2800	1012	"	–	–	–	–	20	60	85	60	1259	..	..	..	..
" 3.	3000	1012	"	–	–	–	–	20	60	80	60	1214	..	..	..	.
" 4	2500	1014	"	–	–	–	–	20	60	80	60	1214	..	0.18	..	..
" 5	2800	1015	"	–	–	–	–	30	60	100	60	1434	115½	..	..	..
" 6.	3080	1012	"	–	–	–	–	34	70	117	60	1688	..	..	..	.
" 7.	..	..	"	–	–	–	–	Starvation day				..	..	..	..	..
" 8.	2500	1018	"	–	–	–	–	40	70	130	60	1834	116	..	..	..
" 9.	2550	1017	"	–	–	–	–	40	80	145	60	1959	..	..	..	.
" 10.	2580	1013	"	–	–	–	–	45	80	150	60	2024	115½	..	..	..
" 12	2500	1018	"	–	–	–	0.7	45	80	150	60	2025	..	..	..	..
" 13.	2500	1020	"	–	–	–	–	Starvation day					..	0.21	..	.
" 14.	2500	1016	"	–	–	–	–	15	30	30	60	624	115	..	..	.
" 15.	3080	1014	"	–	–	–	0.55	20	50	100	60	1490	..	.	.	

pression of the secretion of the urine, nitrogen, glucose, and acetone bodies, of several hours' duration. Under these conditions, an acidosis is very readily precipitated and death from coma very apt to result. Local anæsthesia is safest for minor operations while gas and oxygen is the one of choice for major operations.

The details of treatment are exemplified somewhat in the accompanying charts of patients of Dr. H. B. Anderson and my own.

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DIVERTICULA OF THE URINARY BLADDER

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UNTIL recent years, the occurrence of single or multiple diverticula of the urinary bladder has been considered a somewhat rare anomaly, the attempt at a radical cure of which presented considerable surgical difficulties. Thus in a comprehensive article on this subject published in February of 1912, Lerche gave a resume of all the cases that he had been able to find reported in the literature to that date, a total of only fifteen.[1]

It would appear, however, that modern methods of diagnosis have demonstrated that this condition is not of extreme rarity. Judd reports forty-four cases from the Mayo Clinic up to March, 1918[2], and Hinman has a series of twenty-one cases up to August, 1919[3]. Rathbun of Brooklyn reports five cases seen within one year[4].

Ætiology. The ætiology is obscure, and the dictum of Englisch[5] that "all diverticula having a muscular coat are congenital, while those with a mucous coat only are acquired", possibly needs revision.

Cabot is of the opinion that "Diverticula probably originate from congenital buds which do not go on to ureter formation, and that hernial protrusions in obstructive cases are not diverticula."[6]

Thomas, writing from the Mayo Clinic[7], says, "The rôle that obstruction plays in the formation of these anomalies is not clear, but clinically in a large percentage of cases, it seems necesasry for the development of symptoms. Judd[8] points out that in most cases the openings of the diverticula were not far from one of the ureteral meatuses, but the relationship was not at all constant. He goes on to say that many cases have been cited to show that obstruction is not a factor in the development of the condition. It has been repeatedly demonstrated that, in cases where obstruction does exist, and is removed, the diverticulum persists and continues to cause symptoms, and he suggests that it is possible that this, *i.e.*, the presence of an unsuspected diverticulum, may explain some cases which have not been relieved of symptoms after prostatectomy.

The consensus of opinion appears to be that a congenital deformity or lack of development is a factor in all these cases, but while this may be true it seems reasonable to presume that a very small and symptomless diverticulum might be present for many years, which in the presence of obstruction might dilate, become infected, and produce symptoms.

Incidence. Diverticula occur almost exclusively in the male, though cases have been reported in the female.

The age of the reported cases varies from eighteen to seventy-three years, but the majority are well over fifty.

Symptoms. The symptoms vary with the presence or absence of infection. The most characteristic subjective symptom is a feeling that the bladder is not emptying itself, which in turn produces a frequent attempt to urinate. This frequency may be both diurnal and nocturnal. Another suggestive symptom is the complaint of a difficulty in starting the stream, yet when once started it flows quite freely. This probably depends on the fact that when the bladder contracts the diverticulum is distended, hence not enough pressure is exerted on the internal sphincter to cause it to relax. Consequently additional pressure is required and the attempt is made to supply it by straining efforts of the abdominal muscles. Pain in the lower abdomen, sometimes constant, sometimes colicy, is a variable symptom. It may be severe, and may be referred to the groins, or upward to the loins, in which case renal lithiasis may be suggested. It is probably due to the degree of distension of the diverticulum.

The appearance of the urine varies with the degree of infection, but in cases with symptoms a certain amount of pus is usually present, and this may vary considerably in amount from day to day, the urine being sometimes quite clear, and sometimes very cloudy. While doing bladder lavage, a very suggestive occurrence is to have one or more washings come away quite clear, while the next may contain considerable pus. Blood may be present in microscopic amounts, or more rarely there may be frank hæmaturia.

It will probably be seldom that the symptoms will be definite enough to permit of a diagnosis from them alone, but they should in many cases suggest the possibility of a diverticulum being present.

Diagnosis. Cystoscopic examination will, in most cases, permit of a definite diagnosis being made, and in some cases the cystoscope may be passed directly into the diverticulum permitting of direct observation of its extent. In other cases, fine silver wire or better, an "*x*-ray" opaque ureteral catheter may be passed through the cystoscope into the diverticulum, where it will coil up, and a rœntgenogram will then give a definite picture of its extent and location.

In certain cases, where the bladder is very irritable or the urine contains much pus or blood, the diagnosis may be impossible with the cystoscope alone. In any event the bladder should be distended with a radio-opaque media, and a cystogram made. The various salts of silver and of thorium have been used for this purpose, but a twenty-five per cent. solution of sodium bromide is probably as satisfactory as any. It is inexpensive, easily obtained, easily sterilized, not particularly irritating to the bladder mucosa, and in addition gives an excellent shadow. The cystogram may show one or more diverticula completely, but more often will show a part of the fundus only, the main portion being hidden by the shadow of the bladder itself. Exposure from various angles, or stereoscopic plates will each help in arriving at a correct diagnosis of obscure cases.

Treatment. Methods of treatment which do not aim at a rational attempt at radical removal of the diverticulum should be discarded. Under this head may be placed such crude efforts to bring about cure as incision through the vaginal wall, or the establishment of a fistula by suture of the fundus of the diverticulum to the skin, forcible dilatation of the neck of the sac, or curettage of the mucous membrane of the sac followed by suture of the neck, should also be discarded. In rare cases where the diverticulum is placed alongside the bladder rather than projecting away from it, success may be achieved by a method introduced by Squier[9], which consists in a division of the intervening walls between pressure forceps, and suture of the adjoining edges thus converting the two cavities into one much as in a Finney pyloroplasty.

In general, however, nothing short of a clean-cut dissection and complete separation of the sac, followed by its surgical removal at the neck, with suture of the resulting opening in the bladder wall should be attempted. This may be carried out supra-pubically by either the extra or intra-peritoneal methods of approach, but while the latter may be necessary in some cases, the former is much preferable, and it is very surprising what a degree of exposure of the bladder wall may be secured by the use of care and gentleness in brushing back the peritoneal covering. The bladder having now been opened in the median line, the position, size and number of the diverticula having been definitely determined by inspection and digital examination, their removal may be proceeded with. To facilitate this, Lower suggests packing the cavities with gauze, and Lerche uses a distensible rubber bag for the same purpose. As a rule, however, the insertion of the operator's left forefinger into the sac from inside the bladder, while the right hand works extra-vesically, will prove to be the most useful method of attack. The extra-vesical fatty and fibrous tissues should be brushed away from the sac by blunt dissection until the entire sac is isolated down to the neck. During this manipulation great care should be exercised to avoid damage to the ureter, and this may be rendered more certain by previous catheterization of the ureters, leaving the catheters *in situ* until this part of the operation is complete.

When the entire sac is completely isolated, it should be inverted int the bladder, the neck transfixed and ligated intra-vesically, and the remainder incised. The deficiency in the muscular wall of the bladder may then be closed by continuous suture extra-vesically, and the surrounding fibrous and fatty structures approximated in one or more layers, thus eliminating any dead space. It might be well to leave a cigarette drain down to the suture line in the bladder wall. The median vesical incision is now closed around a fair-sized rubber drain, and the anterior abdominal wall sutured in the usual manner. If multiple diverticula are present, they are of course dealt with in the same manner.

In 1918, Young, of Baltimore,[10] described a method of dealing with this condition, by what he termed intra-vesical invagination by suction. His article is profusely illustrated, and the opinions of such an authority must be given some weight. It would seem, however, that invagination of a true diverticulum by suction would be impossible, that the most that could be accomplished would be the invagination of the mucosa alone, leaving the muscular coat *in situ*, which would certainly predispose to recurrence. In certain cases of saccular herniation of the mucous coat of the bladder through deficiencies in the muscular wall produced by over stretching following urinary obstruction, Young's method might be of value, but these saccules are not true diverticula.

The following case typically exemplifies some of the above mentioned points:

J. C., male, age seventy-one years. Condition on August 1st, 1920:

Complaints. Pain in the region of the bladder and left lower abdominal quadrant. This pain is sometimes intense and colicy, and occasionally is referred to the left loin. Difficulty in starting the urinary stream. Constant desire to urinate. Loss of appetite, weakness, and consequent inability to work.

Previous history. These symptoms have been present for about three years, gradually getting worse. I saw him first about six months ago when he was referred to me by Dr. Wiley, of this city, for "*x*-ray" examination for possible stone in the kidney or bladder. The rœntgenographs were negative. He had, however, a fairly tight stricture of the bulbo-membranous urethra. This was successfully treated by gradual dilatation, without relief of the symptoms, except that whereas he previously had had difficulty in passurine, he now has difficulty in starting the stream but when once started it comes quite freely.

Present condition. A spare, undernourished, elderly man, with well marked general visceroptosis, and a bilateral inguinal hernia.

Urine. Specific gravity 1022, moderate amount of albumin, no sugar. A considerable number of pus cells, and an occasional red blood corpuscle. While under observation, the urine varies greatly sometimes being almost free from pus, and again containing a large amount; at times no red corpuscles, at other times a large number.

Cystoscopic examination was unsatisfactory, owing to the pain caused by attempted distension of the bladder.

Cystograms were made with the bladder containing ten ounces of 25 per cent. watery solution of sodium bromide. One very definite diverticulum was revealed, with what appeared to be the fundi of two more. (Fig. 1.)

As it was evident that the man was rapidly losing ground through toxic absorption, pain and loss of sleep, radical operation was determined on, and carried out on August 23rd, 1920.

Ether anæsthesia, Trendelenberg position, bladder distended with boracic solution. Median incision from two inches below the umbilicus to the symphysis. Prevesical space opened and the peritoneum stripped well back from the fundus and the posterior wall of the bladder. This step was easily accomplished. The bladder was now opened by a median incision at the fundus. On examination of the interior, three abnormal orifices were found, two on the right side and one on the left. On the right side these orifices were about one inch apart, the one obliquely above, behind, and outside the other, which in turn was a similar distance in the same direction from the ureteral opening. On the left side the orifice corresponded in position with the lower on the right. Each of these orifices was about three-eighths of an inch in diameter, but could readily be stretched to admit the gloved forefinger. Exploration by the finger showed that immediately outside this orifice was a sac about one inch in diameter and one and a half to two inches in depth. Roughly speaking, all three were approximately of the same size. Examination of the outer side of the bladder with the left forefinger still within the sac showed that it was covered with irregular bundles of fibro-fatty tissue, which was rather closely adherent to the sac wall proper. Beginning with the highest sac on the right this layer was carefully dissected off, the left forefinger within the sac being of great assistance in fixing and rendering it prominent. Both sharp dissection and gauze displacement proved useful and eventually the sac was completely freed down to the neck. It was now inverted into the bladder and the neck ligated intravesically. The bladder wall was then reinforced on the outside by a continuous suture taking in all the coats but the mucosa, and the same procedure was carried out

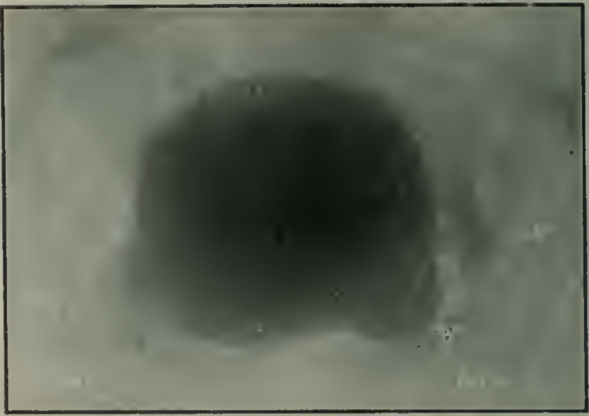

Fig. 1—Cystogram. Note Diverticula "A", "B", "C".

on the second or lower sac. This proved to be somewhat more difficult owing to the depth, but eventually was successfully carried out, and the bladder wall sutured within and without as before. The displaced fibro-fatty layer was then approximated by a running suture to obliterate the dead space, and a cigarette drain inserted. The single sac on the left side was then treated in the same way, and the dead space similarly obliterated and drained. During all this dissection a sharp watch was kept for the ureter and vas deferens, but neither was encountered.

The bladder incision and abdominal wound were now closed in the usual manner leaving a large rubber drain in the bladder.

The operation had required about two hours, but the patient left the table in good condition, and his convalescence was surprisingly uneventful. The tube was removed on the fifth day, and the patient was out of bed on the seventh. He left the hospital on October 15th, with a very small sinus which subsequently completely closed, and on November 15th reported that he was completely free from symptoms and ready to go back to work.

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The Halifax Meeting.—July 5th—8th, 1921. An important communication has been received from the Chairman of the Local Committee of the Halifax meeting with reference to hotel accommodation. He urgently requests that it be secured at the earliest possible moment, by writing to Dr. H. K. MacDonald, 133 Spring Garden Road, Halifax. Applicants should specify choice of hotel and nature of room desired (see March number). They should also indicate as definitely as possible, time of arrival and extent of stay. Provided applications are made in time, the Committee promises to find room for all visitors.

VALUE OF FLUOROSCOPY IN THE DIAGNOSIS OF ABDOMINAL CONDITIONS

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"FLUOROSCOPY" is the method of making studies of opaque objects by passing through them the *x*-rays and observing the image produced on a fluorescent screen. Non-opaque objects, such as hollow organs of the gastro-intestinal type, may be examined by filling them with material which is opaque to the *x*-rays.

The fluoroscopic method has met with prejudice in many quarters, owing to the ill effects of *x*-ray exposure in the early days, when the need of adequate protection was not understood. With the protection afforded to-day there should be no danger to either patient or operator. The patient is exposed to amounts of *x*-ray that can exercise no harmful effect A current of two to five milliamperes with a voltage correspondng to a three to six-inch spark-gap is all that is required with even the heaviest patient There is no danger to the operator, with the fluorescent screen covered with lead glass on the operator's side, if he is careful to keep the size of diaphragm so regulated as to keep the emitted rays well within the borders of the lead glass. Manipulation of the part being examined behind the screen is done with a wooden spoon, or with the hand of the operator, protected by lead-rubber gloves. Although the work is done in a dark room, there is no reason why adequate ventilation cannot always be obtained.

Fluoroscopy being purely a subjective method, the value of the findings depends entirely upon the personal equation. Upon the ability of the operator to interpret correctly the images seen upon the fluorescent screen, and upon the care with which he makes the examination, depends the value of the findings. This is not the field for the *x*-ray technician. The sole function of the *x*-ray technician is the making of good *x*-ray plates. The interpretation of those plates, as well as the interpretation of fluoroscopic images, should be made only by a physician. That physician must not only be well versed in the anatomy, physiology and pathology of the organs under examination, but must also have special training in the *x*-ray appearances of normal and diseased tissues and organs.

The committee which allotted the subject of this paper has given happy expression to the relationship between "fluoroscopy" and "diagnosis" by entitling the paper, "The Value of Fluoroscopy *in* Diagnosis." There is no such thing as "fluoroscopic diagnosis." There is no such thing as an *x*-ray diagnosis, except possibly in the fracture of bones and the detection of metallic foreign bodies. Fluoroscopy is one of the factors contributing to the building up of the diagnosis. Diagnosis is a conclusion reached after correlating the information obtained by all the available clinical methods. Careful history taking, painstaking physical examination, accurate laboratory reports, are all part of the clinical process. Co-ordinated with these, as a fourth clinical procedure, stands the *x*-ray examination, including that most important phase, fluoroscopy. The clinical picture should be arrived at by correlating the information obtained from each of these methods and building all up into a complete diagnostic entity. If this be true, and we hope to be able to show that it is, then the clinician who arrives at a diagnosis without using fluoroscopy where fluoroscopy is available and indicated, is not only rendering his diagnosis less complete and exact, but is doing an injustice to his patient.

What information can fluoroscopy give us in the examination of the abdomen? We shall answer that question, not by attempting to show the superiority of fluoroscopy over other clinical methods, but by showing the contribution which it can make toward the sum total of clinical information obtainable in any given case.

Under the heading "abdominal conditions" will be comprised conditions obtaining in the gastro-intestinal tract, the gall bladder, the liver and spleen, the kidneys, ureters, bladder, and in the

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Read at the Manitoba Medical Association, November 19th, 1920.

female pelvic organs. With the exception of the gastro intestinal tract, including the gall bladder, fluoroscopy is not a primary diagnostic procedure.

The liver and spleen throw shadows on the screen, from which we may determine their position and size. Being placed well under the rib margins they do not normally lend themselves to palpation. The kidneys occasionally may be outlined in very thin subjects, and up and down excursions synchronous with the movements of the diaphragm may be noted. The urinary bladder is not visible except when markedly distended well above the pubic crest, or when it is filled with an opaque substance such as is used in pyelography. Considerable information regarding the ureters and kidneys may be obtained by watching the passage of an *x*-ray ureteral catheter under the fluorescent screen. Obstructions, such as calculi or strictures, will be noted by the catheter stopping and bending. The excursions of the kidneys may be noted by watching the catheter tips. If these movements coincide with the excursions of the liver, kidney adhesions may be ruled out. This would negative almost any inflammatory kidney process, as such process is usually accompanied by peri-renal adhesions. Standing the patient on the feet will show bending of the catheter if the kidney drops.

The female pelvic organs are not visualized by ordinary fluoroscopic methods.

While it is true then that fluoroscopy has but a limited application in the study of the organs just mentioned, yet note must be made of a new fluoroscopic method which promises to greatly increase the value of fluoroscopy in the study of obscure abdominal conditions. This consists in the distending of the peritoneal cavity with oxygen or CO.[2] It throws into relief all the abdominal organs and makes it possible to visualize them, just as the air in the lungs makes the heart and aorta outlines so outstanding.

That part of the abdominal field which best lends itself to study by fluoroscopic methods is the gastro intestinal tract, with the closely allied organ, the gall bladder. As the result of some five years' work, in which the number of the fluoroscopic studies of the gastro intestinal tract has run up into the tens of thousands, the writer has no hesitation in stating in the most emphatic way that examination of the gastro intestinal tract by the fluoroscope is absolutely indispensable. And this is not alone the writer's opinion, but it is the expressed conviction of all who have had much experience with this diagnostic method.

Further, this fluoroscopic study of the alimentary canal, which should not be restricted to those patients who have abdominal symptoms, should be used in every chronic condition which might be the result of toxic absorption from some focus of infection. There are no foci more potent in the causation of general toxæmia than those found in a chronically diseased gall bladder or appendix, or in a banded colon. Only recently a patient with a clinical diagnosis of pernicious anæmia, and without one gastric symptom or physical sign of abdominal disease, was found to have a large inoperable carcinoma of the stomach. The correct diagnosis would have been difficult, if not improbable, without the *x*-ray examination. Chronic headaches and backaches, so-called rheumatism, loss of strength and weight, cannot be correctly diagnosed until after *x*-ray examination of the digestive tract for possible foci of toxic absorption.

Another thing that should be stated with all the emphasis possible is that every *x*-ray study of the gastro intestinal tract should extend itself to every part of that tract. For example, there could be no greater mistake than for a physician to send a patient complaining of stomach symptoms to the *x*-ray man for the examination of the "stomach" only. In the great majority of cases stomach symptoms are not dependent upon stomach lesions, but upon disease in other organs, chiefly the gall bladder and appendix. Every gastro intestinal examination should follow the opaque meal from the œsophagus to the rectum, and should be completed by an examination of the colon by the opaque enema. This will take about four days. But nothing short of the expenditure of this amount of time and energy and money will furnish complete information, and incomplete information with resulting mistakes in diagnosis may cost the physician and the patient more than a dozen complete examinations.

The technique, as practised in our clinic, for the complete examination, and the information looked for at each stage, are about as follows:

At 9.00 a.m. the patient reports without breakfast. If there is any suspicion of urinary tract or spinal disease, radiographs are made. If there is any suspicion of gall bladder disease, plates should be made of the gall bladder region. A fluoroscopic examination is made of the chest. The opaque meal is given. The œsophagus and then the stomach are inspected during its ingestion. Irregularity of the œsophagus and cardiospasm are looked for. The manner in which the stomach fils is often very instructive. In the atonic stomach the meal will sink to the bottom at once and cause such a stomach to sag like a rubber bag. In the normal stomach the column of barium mixture will be held up by the tonic contraction of the musculature and all will fill gradually and evenly. In the stomach which is spastic and irritated from some disease condition, either intrinsic or referred, the musculature will be seen to contract in segments so that when the first half-glass is swallowed it will look much like a rope tied into a succession of knots. It is therefore in order to look for the causes, intrinsic or extrinsic, producing this irritation. When the two glasses constituting the opaque meal are taken, the stomach is inspected for the niche, and the incisura caused by ulcer, the accessory pocket caused by an ulcer that has perforated and the defect of filling caused by malignancy. The size, position, shape, tone of the stomach, and the character of the peristaltic waves are noted. Palpation is done to determine mobility, and to detect any tender area. In about 90 per cent. of gastric ulcers there should be suggestive evidence, which when taken with the clinical and laboratory findings would lead to the diagnosis. In the great majority of such cases the *x*-ray evidence is conclusive. Posterior gastric ulcers usually cannot be visualized, but may be inferred from the combination of increased peristalsis, localized tender area, with visible dilatation of the second part of the duodenum caused by constriction or spasticity of the third part, as it passes behind the stomach at the ulcer site.

Filling defects of the stomach are nearly always due to carcinoma. Unfortunately there is little difficulty in recognizing them, for the carcinoma of the stomach does not usually give rise to serious gastric symptoms until it is advanced sufficiently to show a very obvious filling defect. The exceptions are the carcinomata at the pylorus. They may cause symptoms comparatively early, so that when there is suspicion of the slightest irregularity of outline or peristaltic wave at the pylorus, a number of plates should be taken for more intensive study. Any carcinoma capable of being recognized by the surgeon at operation, should be capable of demonstration by the *x*-ray. Rarely filling defects may be due to inflammatory adhesions from disease of adjacent viscera.

A word may be said about the ptosed stomach. It is one of the triumphs of *x*-ray that it has demonstrated the fallacy of the old text-book pictures of the stomach. There is no set shape or position for this organ. An individual's stomach adapts itself to the body profile. Our stomachs are capable of as many physiological variations as are the noses on our faces. The stout individual has a transverse stomach well above the umbilicus; the thin individual has a vertical stomach reaching normally even to four or five inches below the umbilicus. Between these extremes are all gradations. The only tests of the physiological position of the stomach are its ability to function properly, and its freedom from the production of reflex nerve symptoms by dragging on its nerve supply. The test for the former is its ability to empty the meal on time; the test for the latter, when it is suspected, is the therapeutic one, support.

Passing from the stomach we next examine the duodenum. The first part, the duodenal cap, is the usual site of ulcer. This is recognized by a permanent indentation in one of its borders, which is tender to the touch. A duodenal cap that can even once be filled well and appear perfectly regular, cannot be the site of active ulcer. Duodenal ulcer should be recognized fluoroscopically in nearly every case. Duodenal deformity may, however, result from other causes. There may be the scarring caused by the fibrous contraction of a healed ulcer. In such case pain on pressure is absent. The deformity may be due to adhesions resulting from old ulcer or from inflammatory conditions originating in the gall bladder or colon. In either case there may be uniform deformity of the whole cap, such as a flattening horizontally or vertically. There will usually be fixation in an abnormal position either upward or laterally. Tenderness in the adjoining viscera with absence of tenderness over the duodenum itself will be suggestive. Familiarity with the appearance of the duodenum leads one almost intuitively to differentiate between the acute indentations of ulcer, and the flattened drawn-out appearance of adhesions. Here again the *x*-ray findings must be linked up with the results of the laboratory tests and the study of the clinical history.

Whenever a pathological condition of any kind is even suspected in stomach or duodenum, radiographs should be made for the purpose of more intensive study and of permanent record. Radiographs, without fluoroscopy, are valueless, unless a large enough number are taken, to demonstrate that an apparent deformity is not merely a phase of peristaltic activity.

The demonstration of gall bladder pathology by the *x*-ray has been a subject of much debate. Gall stones, owing to the absence of lime salts in their formation, will show on the radiograph in only from 10 per cent. to 50 per cent. of the cases where they are present. Some claim to be able to show on the plate the shadow of a diseased gall bladder, whereas it is claimed a normal gall bladder will not show. In our attempts to demonstrate gall bladder conditions we rely more upon the fluoroscopic examinations than upon the plates. As a matter of fact the demonstration of gall stones would not be a matter of first importance if we could show them in 100 per cent. of the cases. In the first place, 10 per cent. of all autopsies show gall stones, but only 10 per cent. of the gall stone carriers have ever suffered from gall stone symptoms. In the second place, biliary stasis and gall bladder infection usually precede gall stone formation. And the important thing is the demonstration of the infective process going on in the gall bladder, which may at any time be galvanized into an acute inflammation by some complicating general or local infection. When palpation in the right hypochondrium, under the margin of the 9th costal cartilage, elicits outspoken tenderness or muscle spasm, one can be fairly sure that he is dealing with gall bladder pathology. When this palpation can be done under the fluorescent screen while the barium-filled stomach and duodenum or colon are differentiated by visualization from the tender area, the localization of the tenderness to the gall bladder can be made with almost absolute certainty. When a first part of the duodenum is seen elongated, flattened out and hitched up and to the right in the gall bladder region or a second part of the duodenum is dilated and over visualized, or an hepatic flexure is seen immobilized in that location, one can definitely diagnose duodenal or colonic adhesions to the gall bladder. When you rule out, as you can, pathology originating in the duodenum or colon, the conclusion is evident that the basal condition is a cholecystitis or a pericholecystitis. In an analysis of the *x*-ray findings in some thirty recent cases, where cholelithotomy or cholecystectomy, or cholecystostomy, had been done, the fluoroscopic report showed tenderness localized to the gall bladder area in practically every case. Where adhesions to duodenum, stomach, or colon were found, fluoroscopy has made the additional showing of spastic duodenal cap, or elongated or flattened and hitched up duodenal cap, or over-visualized second portion of duodenum, or fixation of colon, with corresponding added tenderness on pressure over these abnormal areas.

Five hours after the ingestion of the opaque meal the patient again reports, when observation is made of the amount of barium in the stomach and small bowel. The stomach should be empty and the meal should be massed in the coils of the terminal ileum.

Eight hours after the meal, observation is made of the ileo-cæcal region. The meal should be nearly all out of the ileum, and the meal head somewhere in the transverse colon. Note will be made now of the mobility of the terminal ileum, cæcum, and ascending colon. Frequently the appendix will be filled, and its mobility, position and patency noted. The cæcum will be examined for mobility, fixation, filling defects, size, position and shape. Any tender areas will be definitely localized. Notes will be made and compared with findings of the twenty-four hour and forty-eight hour observations. At these later examinations the progress of the meal will be noted, and any malformation or malplacement of the colon studied, while the entire large bowel will be palpated for tender areas.

Appendicitis, acute or chronic, can readily be recognized whether the appendix has filled or not. Tenderness originating at the ileo-cæcal junction and differentiated from cæcum and ileum by visualization will usually be of appendiceal origin. The line of tenderness may proceed in any direction, as the appendix may run anywhere from the gall bladder to the pelvis. Localized tenderness over the butt of a fixed cæcum may be due either to an inflamed appendix or to an inflammatory constricting band across the cæcum. The latter condition can be differentiated only by the opaque enema.

A barium filled appendix is not to be regarded as pathological unless it is tender, or constricted, or bulbous, or fixed, or remains filled after the cæcum has been emptied of its barium.

After the forty-eight hour observation the patient is given a laxative, preferably castor oil. The following morning the colon is examined by means of the opaque enema. The opaque enema is by all means the most instructive method of fluoroscopic study of the large bowel. The whole large bowel can be filled slowly while under observation. Notation will be made of the calibre of the colon, whether large, atonic, redundant, or spastic. Filling defects (usually indicating carcinoma) and constricting bands, if present, will be observed. Adhesions and tender areas will be determined by palpation. The competency of the ileo-cæcal valve will be noted.

We have reported elsewhere[1] the findings from the study of one thousand colons by the opaque enema, and can only summarize results here: Out of the thousand colons examined, only 15 per cent. gave normal findings. The ileo-cæcal region gave pathological findings equal in number to all the rest of the colon. Of those pathological conditions in the ileo-cæcal region the most frequent were those causing ileo-cæcal stasis, viz., constricting bands involving either the butt of the cæcum, or the ileo-cæcal region, or the terminal ileum, or all. This banding cannot be demonstrated except by the opaque enema. That these bands were actually present was confirmed by operation, which bore out the x-ray finding without exception in one hundred and thirty-five consecutive cases. That their removal is beneficial both from the standpoint of the patient's comfort and the lessening of toxæmia, we have accumulating evidence. That these bands must be carefully distinguished from chronic appendicitis is evidenced by the number we see in patients who come to us with the history of having had the appendix removed with no relief of symptoms, but in whom the subsequent severing of the bands gave complete relief.

Diverticulitis of the colon can rarely be seen under the fluoroscope, but is demonstrated on plates taken any time after the twenty four-hour observation of the opaque meal. Apart from operation it can only be diagnosed by the x-ray method.

Mention must be made of another recent diagnostic achievement for which the x-ray alone can receive credit, namely, the early diagnosis of tuberculous ulceration of the colon. The diagnosis depends on the discovery that the colon, or that part of it which is the site of tuberculous ulceration (usually the cæcum) will not retain the barium filling which normally should be found there. Archibald[2] in the address on "Surgery," at the Canadian Medical Association meeting, 1920, stated: "With the x-rays a very early diagnosis of colonic tubercular ulceration is possible. I think it is not too much to say, that in no other part of the body, in the matter of obscure diseases, have the x-rays justified their use so fully."

We have made reference to a new method of fluoroscopic study of the abdominal organs by filling the peritoneal cavity with oxygen. This method originated on the continent of Europe as far back as 1902. The first report of its being used in America for diagnostic purposes was published by Drs. Stewart and Stein, of New York, in July, 1919[3]. Dr. Orndoff, of Chicago, working independently, published reports in September, 1919[4]. Drs. Stewart and Stein say of this new method[5]: "Not only did we find the diaphragm completely separated from the liver and obtain a detail of the liver that had never before seemed possible, but, in addition, we succeeded in actually outlining the spleen with its pedicle, both kidneys, and the uterine appendages. Intraperitoneal adhesions, especially involving the anterior abdominal walls, were easily shown." Dr. Orndoff says: "The procedure of producing pneumo-peritoneum is not difficult. New findings are encountered, which seem to invite the conclusion that the basis for possible new clinical disease entities has been established, and that old disease entities will be relegated to obsolete classifications. Perihepatitis, perisplenitis, and pericolitis with peritoneal adhesions offer new phases for the study of functional pathology of these organs. Post-operative peritoneal adhesions to the anterior abdominal wall may be prevented by keeping the peritoneal cavity distended with oxygen for three to five days, or until the peritoneum is healed."

Dr. Orndoff describes[6] a further innovation which he is using in conjunction with pneumoperitoneum in the fluoroscopic study of the abdominal organs. When he has inflated the peritoneal cavity with oxygen, he inserts into this distended cavity under fluoroscopic guidance an instrument, which is really a modified cystoscope, and obtains a direct view of the surfaces of the abdominal organs. This method enables him to diagnose by visualization such conditions as tuberculous peritonitis, hæmoperitoneum, extra-uterine pregnancy, pyosalpinx, ovarian cysts, hernia. The procedure he calls "Peritoneoscopy."

We have attempted in a very elementary way to sketch some of the things which fluoroscopy is accomplishing as an aid in the diagnosis of abdominal conditions, and have indicated some of the paths along which further progress will be made. Among the discoveries of the future which will make fluoroscopy still more valuable, we look for the perfecting of an instrument which is even now being used in some x-ray laboratories, the stereo-fluoroscope.[7] When this machine is perfected, as it will be in the near future, the fluoroscopic shadows will be seen in perspective, depth will be added to surface shadows. We hope that stereo-fluoroscopy will become as much superior to plain fluoroscopy as stereo-radiography is superior to the flat view of the single radiograph.

In the meantime we believe we have shown that fluoroscopy, as we now practise it, contributes so largely to the sum total of information obtainable regarding abdominal conditions, that we must demand for it a prominent place among our diagnostic procedures. Along the path of visualized study of vital function lies the progress of the future, especially as regards our understanding of the activity of the organs within the abdominal cavity. As Leonard has expressed it:[8] "The living anatomy, physiology, and pathology of the digestive tract has yet to be written, and this can only be done as the results are determined by the study of the living patient by the *x*-ray method."

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HELP

MANY medical students of the senior years, also several 1921 graduates, have made application for appointments during the coming summer.

Graduates:—Available in June for indefinite periods.
Undergraduates:—June till October inclusive.
Locum Tenens:—For whole summer or shorter periods, suggesting One Hundred Dollars per month as remuneration.
Assistants:—Larger number of applicants in this class—more bent upon gaining experience rather than emoluments.

For the convenience of the profession and the students, the office of the Ontario Medical Association situated at 127 Oakwood Ave., Toronto, has undertaken to act as a clearing house. Further particulars will be found elsewhere in this issue. Hospitals requiring internes are also invited to use the service.

The whole plan is an experiment, never having been undertaken previously, so far as can be ascertained. It appears to have particularly appealed to the students. The response from the profession will obviously indicate success or failure of the undertaking.

Case Reports

INTESTINAL OBSTRUCTION FROM GALL STONES

G. H. Clement, M.D.

Vancouver, B.C.

MRS. S., age forty-eight, gave the following history:

On Sunday evening, after eating some nettles, she was taken with severe pain in the abdomen. After heat and hot applications had been applied to the abdomen, she obtained relief. On Monday the cramps continued. On Monday evening the druggist in the town prescribed a purgative, thinking it was a bilious attack. The bowels moved late that evening. On Tuesday, she felt somewhat better, but still had cramplike pains all over the abdomen. No bowel movement. On Wednesday, there was no improvement. Vomiting set in, and continued every two or three hours until late that night, when a doctor was sent for. On Thursday morning, distension was marked, and she was vomiting about every hour. The condition was considered as probably due to a ruptured appendix with general peritonitis, and patient was sent to the hospital.

She had been married for eighteen years, but had had no children. She had had pain occasionally in the upper right side for the last six years, usually at the time of menstruation, and at times had had sharp shooting pains in the region of the liver. She had never been jaundiced. Several times a year she suffered with "bilious attacks".

When the patient arrived at the hospital, her pulse was 132, of poor quality, and was intermittent. The hands and feet were warm. Distention was marked.

Under ether anæsthesia the abdomen was opened by rectus incision below the umbilicus. Free fluid was found in the abdomen; the small bowel was distended, and bluish red in colour; the cæcum and adjoining part of ileum were collapsed. Tracing the small bowel upward, a hard mass was found in the small bowel about two feet from the ileo-cæcal junction. There was marked distention above it. The bowel was incised longitudinally, and a stone removed. The bowel was closed by Czerny-Lambert suture. A mass of adhesions was found in the upper right quadrant around the region of the gall bladder and jejunum. The gall bladder could not be palpated. Further examination was not made on account of the poor condition of patient. 300 c.c. of saline with 10 minims of adrenaline were given subcutaneously during the operation. The patient left the table in fair condition, but did not rally. She died about ten hours after the operation.

The cause of the obstruction was found to be a gall stone one and a quarter inches wide, two and one-eighth inches long facetted on both ends and cylindrical in shape.

This case is reported on account of the comparative rarity of intestinal obstruction from gall stones. Two other cases are reported in the literature. "Impaction of Gall Stone in Small Intestine: Laparatomy: Recovery." Ross, Henry, *B.M.J.*, July 10th, 1909, page 77. "A Diagnostic Talk on Intestinal Obstruction Due to a Large Gall Stone." *Murphy's Clinic,* June, 1915, Vol. iv, No. 3, page 447.

CANADIAN MEDICAL ASSOCIATION MEETING, HALIFAX, JULY 5th-8th, 1921

SURGICAL CLINIC OF DR. F. N. G. STARR*

Toronto General Hospital

TWO CASES OF CARCINOMA OF THE STOMACH

Staff:—*Chief*—Dr. F. N. G. Starr
Assistants—Dr. E. Stanley Ryerson — Dr. James A. Roberts
Dr. Roscoe R. Graham — Dr. George E. Wilson
Resident House Surgeon—Dr. R. V. B. Shier — *Junior* — Dr. A. Y. McNair

CASE No. 1. *Early Scirrhus Carcinoma Causing Pyloric Obstruction—Resection of Stomach—Recovery.* Mr. T. W. H., age sixty-five, referred by Dr. George Young, admitted to Toronto General Hospital March 30th, 1920.

Date and Mode of Onset. This patient enjoyed perfect health up to Christmas, 1919, at which time he began to have slight and indefinite gastric distress. This progressed, until in February he was suffering from continual distention, eructations of food, and was vomiting very foul material. He had a variable appetite. He never noticed that he passed undigested food. On taking food, he had no immediate distress; at times a slight amount of food would even relieve his discomfort. If, however, he attempted to take an ordinary meal, he would have epigastric pain, which would come on from one to three hours after. He states that he has had some difficulty in swallowing. He sleeps well. He does not suffer from headache. His bowels move daily, and he has never noticed the movement to be of an abnormal color, nor has he ever recognized gross blood or mucus. Cardio-vascular system shows nothing abnormal. Blood pressure 150-85. Genito-urinary system shows nothing abnormal. Respiratory system shows nothing abnormal.

Local Conditions. Abdominal examination reveals slight tenderness to the left of the median line. No muscular rigidity; no other masses palpable; no free fluid; liver not enlarged or palpable; spleen not enlarged.

Laboratory Reports. Urinalysis shows nothing abnormal, except questionable trace of bile and a high specific gravity of 1035. *X*-ray Examination: Fluroscopic examination and a short series of plates were made after the ingestion of a barium meal, showing the size, shape and position of the stomach and the passage of food through the tract. Type is hypertonic. Peristalsis is irregular and hypertonic, showing failing compensation. Sphincter is not seen. Caput is not shown. Six hours, 80 per cent. gastric residue, balance small bowel; ten hours, 25 per cent. to 30 per cent. stomach, remainder largely in ileum; trace in cæcum and ascending colon. Twenty-four hours, all in large bowel. Analysis of stomach contents shows the absence of free HCl.

Diagnosis. In view of the fact that this patient had been practically well until three months ago, it would appear unlikely that the pyloric obstruction could be the result of cicatrization following an old gastric ulcer. We know that gastric ulcers can perforate, and that the perforation is the first indication of their presence. Such ulcers, however, belong to the acute type, and are not given to the massive formation of scar tissue. In addition to this, one could make out during the fluroscopic examination, that there was a definite filling defect in the pylorus, with a crater which did not extend beyond the normal line of the lesser curvature. This was due to the fact that the ulcer with the large crater extended from the mucosa outwards, and that the base of the crater was in a plane outside of the stomach outline. In this instance the ulceration seemed to have occurred in a mass which had infiltrated and extended into the lumen previous to ulceration. This is in keeping with the fact that carcinoma in this area arises from glands in the sub-mucous region, and a gross tumor may often be formed before any evidence of ulceration takes place. Thus we feel that this is a case of carcinoma arising in the pylorus, causing pyloric obstruction.

The situation was explained to the patient, but at this time he refused operation. Symptoms continued, and a curious fact was that he gained one pound in weight by March 30th, at which time he entered hospital. The usual preoperative treatment was carried out. Gastric lavage was done. Simple enematæ were given, and he was prepared for operation.

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*From Editorial Board of Ontario.

31-3-23: Operation. Dr. F. N. G. Starr operating. Near mid-line incision right upper abdomen. The cæcum was investigated, and one found a firmly bound down retrocæcal appendix, which showed evidence of old trouble. There was a very extensive adhesion of the terminal ileum deep in the pelvis, which, as it had given no trouble, was left undisturbed. The stomach was explored and a mass the size of a walnut was found in the pylorus, freely moveable and having no abnormal attachments. There were some enlarged glands in the gastro-hepatic omentum, extending up towards the liver fissure. The distal third of the stomach was resected. The jejunem was brought in front of the great omentum and transverse colon, and a point about eighteen inches from its origin was selected for the anastomosis. The jejunem was sewn along the whole distance of the posterior wall of the stomach at the site of section. Serous to serous stitches of chromic catgut were used. The lower two-thirds of the cut end of the stomach was closed by a Connell suture, leaving a small outlet near the lesser curvature, which would simulate the pylorus. The efferent limb of the jejunem left the stomach at the lesser curvature. In this way the food was propelled along the normal course.

Histological Report S–600. Scirrhus carcinoma of the stomach with secondary carcinoma in the lymphatic glands.

Progress. This patient had an unusually uneventful convalescence, leaving the hospital in three weeks, being able to take full diet without any discomfort.

16-12-20. This patient reported to-day, and is in excellent health. He has regained his old weight, and suffers from no abdominal distress.

CASE NO. 2. *Colloid Carcinoma of the Stomach —Resection—Recovery.* Mrs. C., age forty-three, referred by Dr. J. Brooke, admitted to Toronto General Hospital November 22nd, 1920.

Complaint. Pain in the epigastrium, radiating to the back; nausea; vomiting of greenish, foul-smelling material; anorexia; loss of weight; constipation; general weakness.

Date and Mode of Onset. This patient has always been of the thin, wiry type, and previous to 1917 enjoyed very good health. At this time she began to suffer from gastric distress, associated with nausea and vomiting. An *x*-ray examination with an opaque meal showed marked ileal retention, and a fixed and tender appendix, also some delay at the junction of the descending and sigmoid colon. A median line lower abdominal laparotomy was done. The *x*-ray findings were confirmed; the appendix was removed, and the obstruction in the ileum and descending colon were found to be due to adhesions of the bloodless type, and probably congenital in origin. Following this she was very well, until August, 1918, at which time she gave birth to a baby. From this date she suffered from a return of symptoms, but was not seen until March, 1920, when she was admitted to the general hospital. An *x*-ray series with barium meal showed a large crater one and one-half inch in diameter, situated in the lesser curvature in the pyloric third of the stomach. *X*-ray diagnosis at this time was that this was due to simple ulcer. A near mid-line laparotomy was done through the upper abdomen. This revealed a mass in the pyloric end of the stomach the size of one's fist—hard, smooth, and on palpating this through the posterior wall of the stomach, one could feel the large crater in the site indicated by the *x*-ray. This mass was adherent to the pancreas, liver and gall bladder, and resection was entirely out of the question. In order to confirm the diagnosis, however, the base of the ulcer was perforated with a cautery, and a piece removed for section. The opening was closed by catgut and omental graft. The histological report on the tissue removed stated that it was a carcinoma, this diagnosis being made by rapid section, a posterior gastroenterostomy was done to relieve the pyloric obstructions. The patient's immediate convalescence was uneventful. In view of the difference of opinion between the *x*-ray examination and the histological findings, this patient was followed by repeated *x*-ray examinations.

X-ray report April 29th, 1920. "There is no roentgen evidence of the pathological condition that was present before operation on the lesser curvature side. The crater of the ulcer has disappeared, induration now gone and pylorus and lesser curvature are showing very good evidence of pliability. At the side of the crater there is a small adhesion. The stoma of enterostomy is working satisfactorily."

July 7th, 1920. "The gastroenterostomy is functioning very satisfactorily and some of the meal is passing by the normal route. The caput is filling fairly well. At the site of the lesion on the lesser curvature there is now evidence of peristalsis through the whole region. While the peristalsis in this region is hypotonic as compared with the greater curvature, I believe that the hypotonicity is due to scar tissue following the old ulcer and the peristalsis is better than at the examination of two months ago. Beyond the scar tissue towards the pylorus, the pyloric end of the stomach functions very well indeed, and I can see no evidence to make one suspicious of carcinoma. At this examination, I believe the result of the operation is very satisfactory and also am further convinced that this examination adds more evidence in favour of the original diagnosis of ulcer as opposed to carcinoma."

September 27th, 1920. "At this examination the stoma is working satisfactorily, and the pyloric end of the stomach is practically the same as at two and four months after the operation. No evidence yet of carcinoma at the site of old ulcer."

October 25th, 1920. "During the screening at this examination the patient was extremely tender in the upper left quadrant, and on lifting the body of the stomach aside I could see what appeared to be a crater on the posterior wall close to the stoma. A series of plates were done in the oblique directions to show this, and one can see in these plates the gastroenterostomy functioning and just below that there is an area which is extremely suggestive of a new ulcer."

At the time of this last examination, the patient began to have a recurrence of her gastric distress, associated with marked nausea and vomiting. This became progressively worse, and she was admitted to hospital on November 22nd. At this time there was definite tenderness in the upper abdomen, and a palpable mass above the umbilicus, slightly to the right of the middle line. In view of the foregoing reports, it was thought that the *x*-ray evidence pointed to the formation of a new ulcer, and the clinical signs led one to believe that this was attempting to perforate, and that this explained the amount of induration associated with the pain and tenderness. It was considered advisable to explore this region.

Operation 26-11-20. Dr. Roscoe R. Graham operating. The abdomen was opened through the former incision and a large mass was found in the posterior wall of the stomach, very hard, nodular, irregular and adherent to the pancreas. The former anastomosis looked very well. Clinically the tumor mass felt as if it must be malignant. The liver showed no evidence of secondaries, nor were the glands enlarged. However, in view of the former findings, it was considered advisable to resect. There were some adhesions to the liver, which were freed; the duodenum was separated, cut across the distal end and closed by double purse string. The site of the former anastomosis was freed and a crushing clamp placed longitudinally in the jejunum and the anastomosis separated. The stomach was then cut across about its middle between two pairs of crushing clamps. The anastomosis was then separated from the posterior layer of the lesser sac and the middle colic artery was left uninjured. The mass was excised, it being necessary to take a small portion of the anterior surface of the pancreas. The jejunem was then pulled through the transverse mesocolon, held in a limb of a Roosevelt clamp, the cut end of the stomach being placed in the other limb of the Roosevelt, and the crushing clamps removed. It was with difficulty that the first serous layer was put in, because of the tendency of the lesser curvature of the stomach to retract. The anastomosis between the jejunem and the stomach was completed in the usual way, the efferent limb of the jejunem leaving the lesser curvature. The opening in the transverse mesocolon was sutured to what remained of the stomach, so that the anastomosis all lay below this structure. There was a good opening from both limbs communicating with the stomach. By placing the mesocolon in this situation, it was hoped to avoid kinking of the distal loop, thus preventing obstructive symptoms. The abdomen was closed without drainage.

Description of Gross Specimen. A portion of the stomach, the pyloric ring and part of the duodenum. About the pylorus is a large thickened ulcerated area about three inches in diameter, which completely encircles the stomach at this area. The base is very much thickened, and firm in consistency. The edges are slightly heaped up and of firm consistency. At the margin of this ulcer is an old gastroenterostomy opening. About this opening there is another small nodule about the size of a hazel-nut, which is very firm. The tumor on section has a greyish, translucent color.

Microscopic Findings: S-2277. The epithelial cells are growing down into sub-mucosa and muscle layer in small masses, with a great deal of colloid material about them. A few mitotic figures were found.

Diagnosis. Colloid carcinoma.

Progress. The immediate convalescence of this patient has been practically uneventful. There was some nausea for forty-eight hours, but no elevation of temperature, and the wound has healed by primary union.

16-12-20. The patient to-day is out of bed, and is taking considerable nourishment, largely soft solids, with some meat, and is feeling and looking very well, with no pain or distress in the epigastrium.

Comment. All surgeons who have to deal with a large number of gastric carcinomas have recognized the disparity of the gross lesion in the stomach with the clinical symptoms and the physical signs. As a result of this, we have come to realize that gastric carcinoma may give no warning of its presence until it produces mechanical interference with gastric function. This fact accounts for the large number of hopelessly inoperable gastric carcinomas which one meets in regions other than the pylorus; at times one finds a small, easily removable, primary carcinoma of the pylorus, in which the liver is studded with secondary growths. Opposed to this, one often finds a hopelessly inoperable primary carcinoma, with no secondaries in the liver. The explanation of these two widely divergent pathological pictures appears to lie in the type of carcinoma with which one has to deal.

It is interesting to note, in connection with the operable primary growth with secondaries in the liver, that Rutherford Morrison, of Newcastle, resected such a pylorus, the patient going on to an uneventful convalescence, and continuing perfectly well for fifteen months, when she died of a rapidly-developing portal obstruction. In the presence of such a lesion, however, we have been content simply to do a posterior gastroenterostomy. It has seemed that the results of such procedure have been as satisfactory as could be hoped for, in view of the wide disemination of the disease. Case 2 has been a source of great interest to us, inasmuch as it has given new hope in cases, in which on investigation one finds the primary growth forbids resection, because of its infiltration, despite the fact that there is no gross evidence of metastasis. Such was the condition found at the primary operation for stomach lesion. The infiltration around the pylorus was so extensive that the mass was absolutely fixed, and no surgeon, even with unbounded enthusiasm, would attempt its removal. At the second operation, however, the mass itself was readily resectable, the technical difficulty was in this that the stoma of the gastroenterostomy was so placed that, in order to offer a hope of cure, it would have to be removed before a sufficient area of stomach could be resected.

The question no doubt arises: "Why was operation delayed for such a time, in view of the microscopic diagnosis of carcinoma, made at the time of operation, coupled with the fact that subsequent *x*-ray examination would lead one to believe that the area was removable at a much earlier date?" This can be answered in part by asking a further question: "Is microscopic examination, by a competent pathologist, always infallible in differentiating between chronic ulcer and early carcinoma of the stomach?" In this connection, Ewing, in his work on Neoplasms, lays emphasis on the fact that there is a type of ulcer associated with chronic inflammatory overgrowth and heterotopia of gland tissue, in which, without clinical history, is almost impossible of differentiation from carcinoma. He also suggests that the misinterpretation of this histological picture explains the high incidence of carcinoma following ulcer, as reported by McCarty and Wilson, of the Mayo Clinic. The delay in operation is further explained by the fact that repeated *x*-ray examinations with the opaque meal and stereo plates, made by Dr. W. H. Dickson, showed that the deformity of the stomach was rapidly disappearing. Two months prior to the last admission, peristaltic waves were seen to travel along the lesser curvature, traversing the area which formerly was represented by the crater of an ulcer. This led us to believe that we were dealing with one of the irregular inflammatory indurations associated with ulcer, and that to advise further operative interference would be unjustifiable.

This, however, proved to be erroneous. It is comforting to note, however, that *x*-ray examination just previous to operation showed changes compatible with the altered clinical picture, which were confirmed by the gross pathology demonstrated at the time of operation.

The question which one has to settle is: "Have we evidence which will prove or disprove that this did or did not arise secondarily to a simple ulcer?" We feel that in view of the fact that the gross specimen shows such a diffuse involvement, extending uniformly throughout the whole area, that it is extremely unlikely that this did arise from a simple ulcer. The original picture must then have been the result of an effort on the part of the growth to perforate all coats of the stomach wall, and the cautery perforation was a real factor in retarding this. The greatest encouragement gained from this case is the fact that a locally inoperable carcinoma of the pylorus should become operable and remain so eight months, without the development of gross metastases. The explanation of this would appear to be that the great bulk of the tumor was due to an inflammatory reaction, the result of attempted perforation. This experience will serve to stimulate the close observation of such patients after one has been forced to do a palliative gastroenterostomy, instead of a radical resection. The greatest factor in determining whether such a growth will become operable or not will be serial *x*-ray plates, made after a barium meal. Where one can hope for a regression of the tumor mass, we shall in future do an anterior gastroenterostomy in preference to the posterior operation, because of the fact that should resection become possible, one can continuously visualize the anastomosis and thus render the technical difficulties much less formidable.

The striking feature in Case 1 is primarily that there were symptoms at all, and secondarily that they were of such short duration. This bears out our contention that the symptoms are the result of mechanical interference with function, for in this case the growth had produced a degree of pyloric obstruction. Because of our limited facilities in the past, we have been unable to diagnose early carcinoma of the stomach in a large percetage of patients suffering from this disease. As a result, many still visualize a patient suffering from gastric carcinoma as one who is anæmic, much under weight, with intractable stomach symptoms. We must disabuse our minds of the idea of any clinical picture being peculiar to gastric cancer, and indeed must remember that if we are to offer our patients hope from surgical therapy in carcinoma involving any region, our diagnosis must antedate any grave or marked constitutional disturbances.

In obtainihg an early diagnosis of gastric lesions, we feel that the *x*-ray examination with an opaque meal and serial plates is of inestimable value. We are also convinced of the futility of attempting to arrive at any conclusion based on an *x*-ray picture taken with a single plate. Dr. Dickson, who has charge of the gastrointestinal department of the *x*-ray, has thoroughly convinced us of the absolute necessity of serial plates, not only for the identification of pathological conditions, but in order to avoid interpreting normal stomach activity as an abnormality. It has been our misfortune in the last few months to have to undo two gastroenterostomies done for supposed pyloric obstruction; the diagnosis of these cases based on the *x*-ray evidence of a single plate, the obstruction was merely spasm.

In Case No. 2 it will be noticed that the chemical analysis of the gastric contents withdrawn after a standard test meal, showed the absence of free hydrochloric acid. Formerly this fact was considered to be of real value in differentiating between carcinoma and ulcer. At present it appears to be of value only in those questionable instances of a carcinoma developing from an old ulcer? Here one finds that hydrochloric acid is present very often where carcinoma has such a genesis. We well know that the absence of HCl in gastric contents is found in many instances where the gastric symptoms are secondary to chronic gall bladder disease.

The absence of hydrochloric acid in the content of stomachs containing carcinoma is probably explained by the alteration in the gastric mucous membrane. Ewing states "The condition of the gastric mucosa varies widely, depending upon the type and progress of the tumor, as well as upon the previous condition of the mucous membrane. There is a constant tendency toward diminished functional capacity, associated with atrophy of the peptic cells and a metaplastic transformation of gastric into an intestinal type of cell lining, with a marked increase in goblet cells. An increased secretion of alkaline mucus tends to neutralize the acid. This change begins in the pyloric region, and may become very marked, simulating heterotopia of duodenal glands. Observing it in a marked degree, Gosset and Masson were led to believe that all pyloric cancers might be derived from heterotopic duodenal glands."

A point in regard to the technique of the operation is the direction of flow from the stomach along normal physiological channels. It will be noted that in both these cases an attempt was made to have the efflux into the jejunem arise at the lesser curvature. In Case No. 2, the efferent loop of the jejunem leaves the stomach from the lesser curvature. In Case No. 1, the open end of the stomach was closed for the lower two-thirds, and the opening left at the lesser curvature. We believe that this is very important. In some of the earlier resections in which the jejunem was anastomosed to the whole width of the resected stomach, there followed an unusual amount of post-operative nausea, requiring repeated gastric lavage for periods varying from twenty-four to seventy-two hours. Since diminishing the size of the stoma and placing the outlet at the lesser curvature, simulating the pylorus, the post-operative nausea has been markedly lessened, and one is thus saving his patient from a very devitalizing condition in the early hours of convalescence, a time at which he needs all his reserve. This factor has a marked influence on post-operative storms, and materially lessens the mortality. It has not been considered advisable to bring the jejunal loop through the gastro-colic mesentery because of the possibility of obstruction at this point. A long loop carried in front of the great omentum and transverse colon, in the manner in which one does an ordinary anterior gastroenterostomy seems to be much safer. A point is selected at least eighteen inches from the duodenum, and directly anastomosed to the open end of the stomach, after the method advised by Balfour. Such a procedure is much less time-consuming than closure of the open end of the stomach, followed by the regular posterior gastroenterostomy. The functional results of such an operation appear to leave nothing to be desired.

Conclusions

1. An inoperable primary carcinoma of the stomach may become operable following a simple palliative gastroenterostomy.

2. In a locally inoperable carcinoma of the pylorus, with no metastases, an anterior gastroenterostomy is preferable to the posterior, in view of the possibility of a subsequent resection being possible.

3. All palliative gastroenterostomies should be followed by x-ray examination.

4. In placing the anastomosis, following stomach resection, care should be taken to have the efflux leave the stomach and enter the jejunem at the lesser curvature, as this markedly decreases post-operative nausea.

5. The hope of increased operability and prolongation of life lies in early diagnosis. This should mean that all patients suffering from chronic gastric distress, should be examined by means of x-ray after an opaque meal. Serial plates should be made to avoid errors in diagnosis resulting from the use of a single plate. In addition, it is extremely important to have the plates interpreted by one who is thoroughly conversant with gastro-intestinal roentgenology.

Case Report. *Septicæmia.* Mrs. W. L., age fifty-five, widow.

On Wednesday morning, November 24th, 1920, the patient received a rather insignificant cut on the left index finger. The next day the finger was swollen, and in a few hours the swelling extended as far as the wrist. On the third day the whole hand was involved and red streaks were noticed running up towards the axilla. A doctor was called in and hot fomentations were applied. The following day the patient was worse, and she was ordered to hospital, being admitted on the afternoon of Sunday, November 28th.

On admission the temperature was 101°, pulse 112, and respirations 22. On the dorsi-lateral surface of the base of the terminal phalanx of the left index finger was a transverse cut about half-an-inch in length, which did not appear to go down as far as the bone. The edges of the cut were unhealthy and had a greyish sloughy appearance. The fingers and thumb were swollen to about double their size, except the terminal phalanges which were not much enlarged. On the dorsum of the hand was a large blister containing turbid serum. The forearm was only moderately swollen, dusky in appearance, with here and there evidence of blood having been extravasated. On the inner side of the elbow joint was a large blister containing blood-stained fluid. The upper arm appeared normal and there was no evidence of any red streaks. Movement of the elbow was unimpared, but the patient was unable to flex or extend the fingers or move the wrist Over the dorsal surface of the forearm pseudo fluctuation was easily obtainable and without causing any apparent pain. The leucocyte count was 22,000.

The tongue was coated and exceedingly dry. The appetite was poor and there has been some nausea and vomiting with pain in the epigastrium after taking food. She was very thirsty. *For the last seven years she has suffered from diabetes*, with urinary frequency and some pain. The urine contained albumen, pus, and sugar in moderate amount.

The arm was placed every alternate hour in a hot bath of saline and the ordinary general treatment adopted.

The next day the temperature was $99\frac{2}{5}$°, pulse 90, and white blood count 21,400, and the condition of the arm about the same. On the following day, November 30th, being the sixth day of her illness, the temperature was 99°, pulse 90, and white blood count 15,200. Her mouth at this time was so dry that speech was difficult, in spite of every effort to increase the amount of fluids. Fluctuation could be made out on the dorsum of the hand, so it was decided to incise it.

Operation. Dr. George E. Wilson. Under gas and oxygen, incisions were made into the dorsum of the hand and about a quarter of an ounce of thin, grayish pus evacuated. About a drachm was likewise obtained from an incision on the dorsum of the forearm two inches from the wrist. Near the elbow on the same surface another incision was made, from which a small amount of serum exuded. Here the fat was of a grayish color, with here and there small yellowish areas. From each incision smears and cultures were made, and a pure culture of streptococcus hæmolyticus obtained in each instance.

The smear from the highest incision showed hundreds of short chained cocci to a field and, except for a few polymorphonuclear leucocytes, closely resembled a smear taken from a culture tube in the laboratory, so numerous were the organisms.

About four hours after the operation, the respirations began to go up and there was some dirty brown sputum, and she began to sink rapidly and died about midnight.

The autopsy was performed ten hours after death. An examination of the arm showed that the inflammation had extended to the tendons on the dorsum of the hand, which were bathed in a small amount of purtulen exudate. A dissection of the axilla revealed no abnormality whatsoever, and in the fat the glands were hard to find. On histological study, the only change observed was an increase of the endothelial cells. The lungs showed an acute bronchitis with double bronchopneumonia. The kidneys presented the appearance of acute nephrosis and there were petechial subpericardial hæmorrhages. From the heart-blood a pure culture of a virulent hæmolytic streptococcus was obtained.

There are several interesting features in this case. It was noted that the forearm was not tender to palpation and at a time when there were myriads of very virulent streptococci in the subcutaneous tissues. This was due in all probability to the destructive action of the toxin upon the pain nerve endings. Then there was the absence of any gross changes in the axilla and absence of inflammation in the glands, which can only be interpreted as evidence that the bacteria gained access to the blood stream somewhere in the hand and not through the lymph channels. Lastly, the case illustrates the futility in such an instance of obtaining any real benefit from a few incisions into the subcutaneous tissue.

A DISCUSSION OF CASE REPORTS ILLUSTRATING SOME ANOMALIES IN THE TREATMENT OF GASTRIC AND DUODENAL ULCER

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MRS. V., age fifty-one years, multipara, gives the following history: She has had the usual diseases of childhood but nothing of any importance otherwise. About a year ago she became conscious of a certain amount of discomfort after eating, which later became actual epigastric pain, accompanied by belching and followed by vomiting. For the past month she has felt a "lump in the stomach" after eating, the lump disappearing after vomiting or after rubbing. She has lost weight and is afraid to take food because of the pain which was sure to follow.

Examination of the mouth, thyroid, chest and pelvis is negative. The abdomen reveals nothing but some tenderness over the pyloric region. Immediately following the drinking of a glass of water, however, the stomach is felt and seen as a globular mass in the epigastrium—active peristalsis is noted, accompanied by severe colicky pain. Upon close questioning she admitted that twelve years previously she had had "trouble with her stomach", had vomited frequently and had lost weight. She did not consider the malady of sufficient importance to consult a physician and gradually the condition cleared up with no further symptoms until the beginning of her present illness.

From Editorial Board of Calgary, Alta.

X-ray examination confirmed the diagnosis of pyloric obstruction. Fluoroscopically the stomach is noted as large, with hyperactive peristalsis for a short period followed by a hypotonic condition. Small amounts of the barium meal were seen to pass through the pylorus but no cap could be demonstrated. The radiograms showed a five-hour residue.

Examination of gastric contents—250 c.c. of a yellowish colour were withdrawn containing 15 c.c. of undigested food and some currants which had been eaten the previous evening. Analysis showed a total acidity of 49, free hydrochloric acid 20·5, and no lactic acid. The white blood cell count was 8,500.

Operation disclosed a hypotonic stomach with a mass nearly the size of a small jap orange at the pylorus. This mass was smooth, not adherent and the overlying peritoneum was normal. The pyloric ring would not admit the point of the finger and the condition was very similar to that found in hypertrophic pyloric stenosis in children. No enlarged glands were palpable in the mesentery; the gall bladder and other abdominal organs appeared normal. A posterior gastroenterostomy was done and the patient made an uneventful recovery. She remained in hospital twelve days, since which time she has continued to gain in weight, has absolutely no discomfort or pain and states she never felt better.

I regret that I did not resect a portion of the tissue for microscopical examination but I am of the opinion that the mass is the cicatrix of an old ulcer whose beginning dates back twelve years.

This case demonstrates that ulcers of the stomach and duodenum are healed by nature, even without the aid of the physician. But I am of the opinion that had this patient received proper medical treatment twelve years previously a permanent cure would have resulted without the formation of abundant scar tissue and without stenosis.

Just here I should like to call attention to a few points in the medical treatment of gastric and duodenal ulcers. In the first place, cases of this kind do not usually remain in hospital long enough. Some cases may require months of hospital care. It is not always easy to ensure this, but there is little doubt that by this means many more cases would be cured by medical measures. It is not enough to prescribe an alkaline mixture containing soda bicarbonate for such cases. Repeated gastric analysis should be made, and enough of the proper alkali administered to reduce the acidity or to neutralize it. Latest reports of the action of soda bicarbonate on the stomach are to the effect that it does neutralize the acidity at first, but later causes an increase of the hydrochloric acid, and that the last state may be worse than the first.

Some of the magnesium salts, especially magnesium oxide have a much better action in neutralizing the excessive acidity. Olive oil seems to act as a depressor of the acid forming function, and will be found to be a very valuable help. Of course a proper diet must be prescribed.

An eminent surgeon on being asked when to operate in cases of gastric and duodenal ulcers replied that he often operated after seven distinct medical cures. It is very probable that such statements could not be made, had the medical treatment been more scientific and more persistent.

Only this spring, on my way to Vancouver, I met a young lady who had been operated on for gastric ulcer in a neighbouring city some months previously. Her symptoms had not been relieved, and she had been and was subsisting almost entirely on tea and toast. She had been advised to go to the Coast to see if she would not improve, failing which she was to return and be operated on again. This is perhaps an extreme case, but I mention it here to show how surgeons sometimes overlook the physiology of the stomach and bring discredit on surgery. Too often our surgical patients are dismissed after a gastroenterostomy or whatever operation may have been performed for the relief of gastric or duodenal ulcer, and no further care is taken of them. They are allowed to choose their own diet and mode of living, and the final result is far from satisfactory.

As to the operative treatment of gastric and duodenal ulcers, I think it will be found that most cases of the duodenal variety are entirely relieved by a simple gastroenterostomy. Either anterior or posterior matters little if properly carried out. Care should be taken to see that a diseased appendix or gall bladder is not overlooked. In cases of gastric ulcer many seem to favour removal of the ulcer if not so large as to deform the stomach by its removal, or a partial gastrectomy combined with gastroenterostomy.

It is unfortunately true that there are a certain number of cases of duodenal ulcer, as well as gastric, which do not seem to produce any subjective symptoms, and the first warning the patient may have is the sudden intense pain and collapse caused by the perforation of the ulcer. It would seem that there are certain "silent areas" in the stomach and duodenum, which, if attacked by ulcer, do not give any warning of their presence. Such a case came to my notice a short time ago.

J. H., plumber, age thirty-two, was at work in the afternoon when he was seized with a severe sickening pain in the epigastrium. He was forced to drive to his home, when hot applications were applied without relief. Three hours after his first pain I was called and found him in a rather shocked state, the abdomen board-like, especially the upper half. He was tender over the whole abdomen, but more especially in the substernal region. He had vomited,—pulse 110, temperature 98°. I could get no history of any previous gastric disturbance except that some two months previously he had felt a little "indigestion" for a day or two which was entirely relieved by a dose of cascara. He was sent to hospital and an immediate operation performed. I found a perforated duodenal ulcer but fortunately very little stomach contents had been extruded. The ulcer was closed, reinforced with omentum and a posterior gastroenterostomy done. An uneventful recovery followed, and so far the patient remains well.

CASE OF LUETIC CIRRHOSIS OF THE LIVER, SUCCESSFULLY TREATED BY ANTI-SYPHILITIC MEASURES AND REPEATED TAPPINGS

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THE patient concerned was a female, age thirty-seven, and a Canadian by birth. She first showed signs of illness in January, 1917, her earliest symptoms being pain in the region of the liver, slight jaundice and vomiting. Her past history was one of continuous poor health, with attacks of migraine, indigestion, sour stomach, and from time to time peripheral neuritis in her feet. She had never been an alcoholic, though from time to time she had taken wines of the so-called tonic variety. Recently she had lost much in flesh, declining from 166 to 117 pounds.

She was seen by me for the first time in April, 1917, about two and a half months after her initial symptoms. She presented the appearance of a debilitated woman, distinctly jaundiced, and her abdomen was distended with fluid. She had already been tapped four times by another physician, who had given her some few injections of mercury. The temperature was 99°, pulse 98. Paracentesis was performed for the fifth time on April 17th, in the usual way, and two quarts of pale, clear, yellow fluid were removed. Small doses (7½ grains) of iodide of potassium, three times daily, were prescribed, which early produced a marked papular eruption.

In consultation with Dr. C. F. Martin, who concurred in the diagnosis of syphilis of the liver, the iodides were increased to 20 grains, three times daily. In view of the recurrence of the acneiform eruption, the medicine was changed to small doses of proto-iodide of mercury, three times a day, and later four times daily.

The fluid in the abdomen returned gradually, and was again removed, and one could feel below the right costal margin the hard edge of the enlarged liver, somewhat nodular in character; there was also a very definite enlargement of the spleen. Shortly afterwards the patient was sent to the Royal Victoria Hospital where the Wassermann test was found positive, and a few injections of salvarsan, followed by injections of salicylate of mercury, were given. Later on the patient was sent back to her home for a continuance of the treatment with potassium iodide and mercury. This was continued for one year, and to-day, some four years since the onset of her treatment, she is apparently quite well and enjoying her ordinary routine of life.

It is interesting to note that the fluid removed from time to time varied much in quantity; at one time ten quarts were removed, at other times less; the amount removed being determined by the comfort of the patient. It is further of interest to report that no history of lues, or any other of its symptoms, could be obtained from the patient.

Syphilis of the liver in itself, manifested by a generalized cirrhosis, is not a very common condition. Among 2300 autopsies at the Johns Hopkins Hospital, there were forty-seven cases. In nineteen of these there were gummata, in sixteen there were scars, while in twenty-one there was definite cirrhosis. Six of the cases were congenital.

MALIGNANT DISEASE OF THE LUNGS, SECONDARY TO CARCINOMA OF THE PROSTATE. PATIENT IN FAIR HEALTH FOR MONTHS

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THE patient, age sixty-five years, was seen in the out-patient department of the Royal Victoria Hospital complaining of cough, dyspnœa on exertion, and pain across the shoulder. His general health had been fairly good, but for two months past he had suffered somewhat from chronic cough, and increasing dyspnœa on exertion. Pains developed across the upper part of the back, and at the time of his admission were his chief source of distress. They were particularly severe at night but were not aggravated by coughing or deep breathing, and were described as burning in character. The expectoration, which was not copious, was dark in colour and at times blood streaked. There were no chills, fever, or night sweats. The patient's only other complaint was some difficulty and frequency of micturition, but he had no pain or hæmaturia. There was no special loss of strength, though his weight had diminished by ten pounds during recent months.

It was learned that the urinary symptoms had developed during July, 1919, and for this condition he had been admitted to the hospital and was found at that time to have an *inoperable cancer of the prostate.* Suprapubic drainage had been done with relief to the local symptoms, and since that time he has carried on his ordinary routine comfortably enough, till the development of cough and pain in the chest two months ago.

The present examination showed him to be of good nutrition, with normal colour to the mucous membranes, though with a somewhat pasty appearance of the skin; the muscles were soft and flabby. The dyspnœa, cough and expectoration, as above described, were the chief features of the symptomatology, apart from the prostatic condition already mentioned.

The chief interest centres around the condition of his chest. The thorax was of an emphysematous type, and expansion was symmetrical but limited: tactile fremitus was normal. On percussion *irregular areas of impairment* were found over the posterior surface of the lungs, from the fourth to the eighth dorsal vertebræ, most marked on the left side. The breath sounds were generally weakened, but somewhat harsher over the regions dull to percussion, and scattered moist râles were heard at the bases and in the left axilla.

The fluoroscopic examination of the lung and the subsequent stereoscopic plates, showed well defined areas of density in each lung, more especially in the left. These areas presented the usual appearances of a secondary growth, rather than of a tuberculous involvement.

In other respects, the physical examination gave no evidence of disease, and repeated examinations of the sputum has failed to reveal bacilli. There seems to be no reason for doubt as to the nature of these areas in the lungs. It is remarkable that this patient should maintain comparatively good health, notwithstanding the extent of the primary lesion, and a secondary invasion of the thorax. He has been seen repeatedly since leaving the hospital, and while his condition continues to progress unfavourably, he nevertheless is still able to carry on a certain amount of light routine work.

Editorial

ADVANCES IN THE TREATMENT OF HYPERTHYROIDISM

GRAVES' Disease or Hyperthyroidism has presented many problems, the solution of which has demanded the activity of all departments of scientific medicine, and to which each has contributed its quota of valuable information.

The internist has of late years been especially interested in the study and detection of mild grades of the conditions causing more or less pronounced invalidism and simulating other diseases.

The chief problem affecting the surgical treatment has been, however, the development of a pre-operative preparation, an operative technique, and a post-operative care by which the margin of safety to the patient has been progressively increased. Biological chemistry in the study of metabolism now permits empiric experience to be interpreted in terms of scientific exactitude.

In Kocher's epochal work upon goitre we view the efforts of this master surgeon and clinician to discover a safe criterion for operation upon goitre cases associated with hyperthyroidism and the enunciation of definite rules of surgical procedure. Kocher recognized the value of refrigeration; employed exercise as a test of myocardial stability; sought in the differential leucocyte count an index of the gravity of the toxæmia; and resolutely set his face against the use of inhalation anæsthesia. Although the differentiation between cases of Graves' disease and toxic adenoma had not clearly emerged, Kocher further found by experience that the radical operation of that day (lobectomy) could not be undertaken safely as a routine, and advocated vascular ligation, first practised by Wolfler, as a preliminary measure in the more serious cases.

Barker of University College Hospital, London, measurably advanced upon Kocher's cocaine analgesia by using beta eucaine and an improved method of infiltration.

Still the mortality following operation remained high. The severe and often fatal reactions following operation were variously ascribed to (1) nervous shock; (2) compression of the gland during operation; (3) absorption of liberated thyroid secretion from the divided surfaces of the gland; (4) hæmorrhage; and (5) infection. Crile met all these conditions with a technique which eliminated the unexpected, the chief cause of nervous excitation; reduced traumatism to the irreducible minimum; and advocated combined local and gas-oxygen anæsthesia. As a result the mortality figures rapidly declined.

The latest and greatest advance is due to the clinical application of important laboratory discoveries. The names of Lavoisier, Rubner, Benedict, DuBois, and Tissot are closely associated with the development of apparatus and technique for the estimation of the basal metabolic rate in animals and man, and for substantiating what has long been assumed, that the thyroid is the chief regulator of chemical activity within the organism and is responsible for variations in the basal metabolic rate. Kendall's isolation of the active constituent of the thyroid—thyroxin—has placed within our grasp proof of the metabolic function of the thyroid and at the same time the means of demonstrating with mathematical precision the effect of known quantities of thyroxin upon body metabolism.

Thus the advances in technique and improved clinical control have largely eliminated surgical risk, and the future would seem to promise to the public a release from the thraldom of an affection which in the past has been attended with a high death rate and in a still larger proportion of cases has left the individual with an irreparably damaged myocardium.

To properly benefit by these advances in medical knowledge it is essential that patients with hyperthyroidism be carefully segregated and studied apart from the exciting influences of a general hospital ward, and we view with satisfaction the recent action of the management of the Montreal General Hospital in providing such accommodation and installing the apparatus, under the control of a physiological chemist, for the estimation of the metabolic rate.

It is expected that this stimulus will result in the tabulation of information which will be available to our readers in future editions of this JOURNAL.

THOUGHTS ON PROBLEMS ARISING IN CONNECTION WITH THE TREATMENT OF THE INSANE

THE medical profession will easily recognize the advisability of revision and change in the present law as it applies to the question of insanity; more particularly in reference to the ease with which it may be employed by relatives who desire to obtain the freedom of an asylum patient. It is not difficult for any of us to recall instances of patients formally committed to asylums who have been released after a short period of confinement. and have more or less promptly attempted, or even succeeded, in committing some terrible crime, the result of their insane ideas. The history is usually the same. The patient has suffered from a monomania or a paranoiac form of insanity and has improved somewhat under treatment during confinement, although considered by the hospital authorities as by no means cured. The solicitations of relatives who promise to be responsible for the patient secure his release. If this release were not so given, habeas corpus proceedings would very soon secure it. But what to an alienist is a serious and sometimes dangerous symptom, may to the uninitiated appear merely as an idiosyncracy. and thus the relatives' shouldering of responsibility may be no protection to the public. It is not as simple a matter as it might seem to draw up laws which with justice to all would obviate this danger. Where relatives wish to act against the judgment of hospital authorities, the decision of a committee of experts would be more reliable than that of a judge of one of the civil courts.

Our attention has also been drawn to a

change in the law which has recently come into effect in the Province of Quebec, which cannot but be considered as not only undesirable, but even a positive step backward. No individual who is insane can be asked to stand a trial. Formerly, in the Quebec Province, in a criminal case, if any question of the sanity of the prisoner arose the Superintendents of the hospital for the insane, as Government officials, were called in, and after sufficient examination and observation gave their opinion by which the action of the court was guided. But now this is changed, and the Attorney-General has decided that the burden of proof of insanity is on a criminal who pleads that insanity. Thus one can see the possibility in the future of a Thaw trial in this province with all its distasteful revelations and obnoxious publicity—to say nothing of the injustice to a prisoner really suffering from mental disease. Why was the change made? Certainly one would not suggest that the Superintendents of our asylums were lacking in experience, and, being paid by the Province, they would surely be more likely to be unbiased. These points, I believe, were not questioned, but I am informed that these men sometimes made as much as $1,000 a year above their salary in this sort of work, and it is thought to be too much. We advocate economy, but the salaries of the Superintendents of Asylums are not so generous that an extra $1,000 or $2,000 should be weighed against the huge expense to the Province, and the undesirable notoriety of a local Thaw trial.

HYDROCEPHALUS

THE layman can diagnose "water on the brain"; and Hippocrates, who tapped the ventricles, could do about as much towards its cure as the most learned among his children in Science have been able to accomplish through all these centuries, up to the last two or three years, Hydrocephalus in infants has always been considered a fatal disease, with very few exceptions; and that conception is still not far wrong. It has demanded courage on the part of surgeons to undertake its treatment; the courage that one needs when treading unfamiliar and dangerous paths in the dark. But the adventure has been justified by the hopelessness of any other, non-surgical, plan of action. Much light has been needed; and now, in this last decade or two, light is being brought. Nearly thirty years ago Key and Retzius demonstrated the final step in the circulation of the cerebro-spinal fluid, its absorption into the veins of the pia-arachnoid and the longitudinal sinus. Leonard Hill, Cushing and others have confirmed this; and Weed, in Cushing's laboratory, has largely amplified our knowledge of this subject. It remained, however, for Dandy of Johns Hopkins to clear up a great deal that was still obscure and to apply the knowledge to practical use, so that within the last two or three years we have come to entertain new and not small hopes of being able to cure by operation many of the cases of hydrocephalus that have in the past been considered hopeless. Dandy's papers have been appearing at intervals since

1913. His work up to a year ago was reviewed in these columns a few months since and needs no repetition here. That work may be summarized in his own words: "Every case of hydrocephalus has a specific cause which can and should be located by clinical tests during life In a great many instances this cause is easy of correction by operation, with the resultant cure of the disease." In a recent paper* he describes a certain group of cases of hydrocephalus caused by closure of the foramina of Luschka and Magendie, a sub-division of the general group of non-communicating hydrocephalus. Of course, cases of this character have long been recognized as due to inflammatory adhesions at the base following a meningitis. Dandy's observations, however, bring these into a definite class by themselves, which in many instances can be diagnosed by his methods of injection of air and of a dye into the ventricles or the spinal space. He points out that there are apparently two types of occlusion of the foramina of Luschka and Magendie. One occurs congenitally and is well advanced at birth, while the second, which occurs at any age, always follows some form of meningitis. There are no clinical features which permit one to make an absolute diagnosis. On the other hand, the lesion, having been determined by ventriculography and by the phenolsulphonephthalein test, can always be found at operation. In the congenital case there are frequently no evidences of fœtal meningitis in the shape of adhesions, and in such cases Dandy believes that hydrocephalus results from the failure of the foramina to develop, rather than from a secondary closure after their development He reports a series of some nine cases, the details of which must be read in the original.

He goes on to present an operative method for the formation of a new foramen of Magendie. This consists briefly in the very simple procedure of cutting a hole in the much dilated coverings of the fourth ventricle. In one case, a boy of nineteen, the result was extraordinarily good. The symptoms, which had been severe, disappeared, and the boy was able to return to school life. In another case, an infant of three months with extreme dilatation, puncture of the ventricle quickly resulted in death. And in a third case, an adult, to construct a new foramen, it was necessary to excise a large scar at the foramen of Magendie. The patient recovered, but in Dandy's opinion recurrence remains a possibility. In the successful case, the restoration of the paths of absorption over the cortex was demonstrated by the injection of air into the ventricles.

Thus we see, as indeed so often before in medical history, that the things regarded as hopeless by one generation become the hopeful things of the succeeding generation; single-eyed pursuit of knowledge, even in the most unpromising fields, will usually bring its due reward.

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*The Diagnosis and Treatment of Hydrocephalus due to Occlusions of the foramina of Magendie and Luschka. *Surgery, Gynæcology and Obstetrics*, Feb., 1921, p. 112.

Correspondence

The Acute Abdomen

To the Editor,—

I AM personally much pleased to notice at page 140 of your February issue, an editorial half apology and half protest for the frequent recurrence in that number of the terminal abomination, "Acute Abdomen," although carefully written, as you suggest, within "quotation marks". Your apology for your correspondents is that "they are forced to use it because it is convenient, and very expressive," and with this statement I ask leave to join issue.

"On what compulsion *must* they (I)? Tell me that." You allege it is "convenient". Now, what is the innate sense of "convenience"? The N. E. D. gives it as coming from the Latin *convenientia*, meeting together, agreement, accord, harmony, conformity, suitableness, fitness; and defines it in English under several heads, such as agreement, congruity fitness, aptitude, moral or ethical fitness, propriety, suitable, well adapted, ease or absence of trouble in use or action, material advantage or absence of disadvantage, saving trouble, opportunity, etc. Will any serious-minded person, then, admit the "convenience" of this travesty as a laudable expression Will not, rather, such a one "condemn" it as totally unfit and unbecoming? Appleton's Medical Dictionary (1915) scorns to mention it, and it is not to be found in the indexes of several works on surgery hastily consulted. I am quite aware that it is English in its origin (and I was greatly astonished at the Englishman who introduced it); but is it English in any other sense? But, again, you say it is "very expressive", and here, I suppose, it will be contended that its association with "Abdomen", which hides or conceals its contents (*abdere*) makes it "fit" to express a "hidden" meaning. But what does the term "acute" openly express? Here, again, N. E. D. affirms: Sharpness, pointedness (*i.e.*, having the form or qualities of a needle), penetrating, pungent, sharp, clever, as applied to diseases (not anatomical parts), coming sharply to a point or crisis, not chronic.

What picture does the expression "Acute Abdomen" conjure before the eye? The only one that I can think of is an internal abscess pointing at the umbilicus. By a stretching of language, or using the word in the sense of an acute angle, as applied to a ridge, one may, possibly, think of a scaphoid or a carinate abdomen, which surely here does not fit the case.

Apologizing for my prolixity, let me say, in conclusion, that I hold it to be the province and the proud privilege of the Medical Press to preserve the purity, the propriety and the integrity of Medical Speech. *"Hinc illæ lacrymæ"*. As a *reductio ad absurdum* give me leave to add (*Verbum non amplius addam*): The *lingua Franca* term "Acute Abdomen" may be said to be the *facies Hippocratica* of our *English tongue*. *Proh: pudor!* Put it out at once and for all; and let it be seen no more, nor its *nigrities* offend again!

Yours truly,

I. H. CAMERON

Toronto, February 23rd, 1921.

Peccavimus

MR. CAMERON's letter of protest, which appears above, has been forwarded to me, with the suggestion that I, as being responsible for the original editorial, should write a reply.

Mr. Cameron is one of few on this side of the water whose life-long study of surgery has not impeded a life-long study of the classics. And your student of the classics is always a student of the best in English literature. Such an one, with this double fired devotion, will always be found to be an ardent defender of "the purity, the propriety, and the integrity" (three most felicitous words!) of our English speech. And such an one is Mr. Cameron, a man *integer vitæ scelerisque purus.* Our ordinary minds constantly run from the general to the particular. *Purus!*—not only of crime in general, but in particular of the crime of mishandling our good English prose, such as the finer minds of the past have made and moulded it. He is right. Let no contributor, henceforth, approach us with the hideous ellipse "acute abdomen" on his lips, or rather on his pen. We shall metaphorically administer to him, should he hazard it, such a *coup de pied* on his forward parts as will incontinently make him retreat, bearing with him an acute condition inside his abdomen. A similar reception awaits those who desire to "stress" a point, or "sense' a fact, or "vision" an idea. Mr. Cameron is right. *Peccavimus!* We ought not to have let the phrase pass, even in quotation marks. No plea of "common usage" shall be urged to justify it. "Common usage" has had over ten centuries in which to mould our language, and has got across (oh, the frailty of the most willing disciple—"got across' ' many a monstrosity. But common usage can be allowed no more latitude; else we shall be told that Julius Cæsar was carried off by an "acute thorax" (traumatic); or that Sisera lost his life through an "acute cranium" (likewise traumatic); or that a combination of "acute abdomen" (epigastric) and "acute lower jaw" cost Jess Willard the championship.

Our speech needs no further enrichment; neither shall any be allowed to clip it. "Acute abdomen" is an ugly clipped thing. Mr. Cameron, once more, is right But will he please give us a short and sweet smelling substitute for the phrase that we both condemn?

E. W. Archibald.

Montreal, March 10th, 1921.

Obituary

HUGH A. McCALLUM, M.B., M.D., M.R.C.S., L.C.D.

In the passing of Hugh A. McCallum the profession of medicine has lost a far-seeing and deep-thinking member and the Canadian Medical Association an active and devoted promoter of her interests. Born in 1860, his early life was spent on the farm as was that of so many others of the most capable members of the profession. After teaching a year or two, he entered the Western Medical School of London in 1883, from which he was graduated as gold medalist in 1886; he obtained the degree of M.B. at the University of Toronto the same year. He settled at once in London as a practitioner, and next year was appointed Lecturer in Physiology in the Western Medical School. Later he went to Johns Hopkins for study in physiology and in 1889 was appointed Professor, filling this position until 1898. Transferring his activities to clinical medicine, he spent 1900 in London, Eng., for clinical work, obtaining the qualification of the M.R.C.P. and the M.R.C.S. at the London Colleges. He became Professor of Medicine in 1909. During these years he took courses in clinical medicine from time to time at the Johns Hopkins and the New York Hospitals. He was appointed Dean in 1913 which he held till 1919, then becoming a member of the Board of Governors of the Western University, retaining it until his death. During all these years he was very active in improving the status of the School. He accepted the position of Dean that he might the more effectively promote these aims, especially in securing whole time professors in the preliminary subjects, and was successful in attaining his object. Perhaps his greatest work was in securing from the Government the establishment of an Institute of Hygiene, the first of the kind in America. He was President of the Canadian

Dr. Hugh A. McCallum

Late of London, Ontario

Medical Association at its meeting in London and proved a most capable officer.

He possessed the faculty of teaching in a high degree and by his intense earnestness and optimism imbued both staff and students with his own high ideals. He lived to see a fine large medical building built, the hospital much enlarged and improved, and a large hospital for children under construction, work largely due to his initiative and enthusiasm, an achievement creditable to any man.

He won distinction not only as a physician of rare attainments, but also as a man of strong character and broad culture and deep sympathy. He soon made his way to a leading place in the community and took a keen interest in all movements for the public good.

One of his closest friends early in his career and one who influenced him most along a certain course, was the late Dr. Maurice Bucke, who was Superintendent of the Hospital for Mental Disease, a thinker of rare power of penetration and a great admirer and friend of Walt Whitman, whose poetry exercised a strong influence on McCallum's life. As one of his friends writes, "Dr. McCallum was religious down to the core." He agreed with Walt Whitman that "no man was ever half religious enough." His death occurred on January 25th after three days' illness from acute pneumonic fever. Thus passes in the zenith of his career a man of rare character and usefulness.

DR. GEORGE MURRAY CAMPBELL

Dr. George Murray Campbell was born at Truro, N.S., on June 8th, 1861, a son of Mr. Duncan Campbell. The family traced its descent from the Campbells of Argyle. After passing through the Truro Academy he entered the University of Dalhousie in the session of 1878-9. His university career was one of unusual distinction. He had entered with a Professors' Scholarship, and he was awarded prizes in Mathematics, Classics and Metaphysics, and the bursary of the North British Society, and he graduated B.A. in 1882 with honours in Mathematics and Physics, the University prize in Astronomy and the Sir William Young Gold Medal. He was very popular with the students of all years, took a leading part in student affairs, and was prominent in athletics.

He then went to Johns Hopkins University where he continued his studies in Mathematics, and in Astronomy under the late Professor Newcomb. To the last he kept up his interest in Astronomy in all its aspects. At this time it appeared that his love and aptitude for pure science would determine his career, but he decided to study medicine, and after some time spent at McGill he went to New York, and graduated M.D. from Bellevue Hospital Medical College in 1890.

He settled in Halifax where his brother, the late Dr. D. A. Campbell, who predeceased him by less than two years, had been in practice some years, and who, after the death of the late Dr. D. McN. Parker, became the leading consultant physician in the city and province. Here he soon established himself as one of the most successful practitioners in the city. He was on the staff of the Victoria General Hospital, as a visiting physician, and was Professor of Histology and Examiner in Pathology and Bacteriology in the Medical School. He took an active part in civic and national policies. He was a Conservative in politics, and was twice an unsuccessful candidate for the Nova Scotia Legislature. He was an Alderman and in 1906 was Deputy Mayor of the city.

Dr. Campbell also took a keen interest in military matters, and at the time of his death was Senior M.O. 7th Regiment, Garrison Artillery, with rank of Colonel. He threw himself with great energy into the work of the C.A.M.C. on the outbreak of the war and took a leading part in the organization of the Dalhousie University Hospital (No. 7 Stationary Hospital).

Dr. Campbell was an admirable colleague, loyal and courteous. His co-operation, his unruffled calm, and his gift of quiet and piquant humour will long be missed in our Society meetings.

R. J. B. HOWARD, B.A., M.D., F.R.C.S.

Dr. Howard, who died in England on January 9th, was the elder son of the late Dr. Palmer Howard, dean of the Faculty and professor of medicine in McGill University.

After graduating in arts and medicine at McGill University in 1882, when he was awarded the Holmes gold medal, he spent two years in London and the Continent, and was one of the first Canadians to gain the coveted F.R.C.S. diploma.

On his return to Montreal he was appointed demonstrator of anatomy at McGill and pathologist and assistant surgeon to the Montreal General Hospital. Students of that period will remember him as a painstaking and able teacher with an accurate knowledge of his subject.

In 1888 he married the only daughter of Sir Donald Smith, later Lord Strathcona, by whom he had three sons and two daughters. The sons all served in the war and the second was killed in action.

For many years Dr. Howard has made his home in London. He was active during both the recent and Boer wars in hospital duties and in supervising and organising relief work, receiving special mention and the O.B.E. in recognition of his services.

Dr. Campbell Howard, professor of medicine in Iowa University, is a brother and Mrs. Futcher of Baltimore a sister of the deceased.

Abstracts from Current Literature

SURGERY

SURGERY OF THE HEAD AND NECK

Avulsion of Scalp and its Treatment. (L'arrachement du cuir chevelu et son traitement). LENORMANT, CH.: *Jour. de Chir.*, Jan., 1921, Vol. 17, p. 8.

THE author reports two cases, one of which was seen immediately after the accident, when an attempt at reapplication was unsuccessful. It was later treated by Delbet with Thiersch's method of skin grafting. The second case was not seen until some time after the accident and was cured by two seances of skin grafting.

The literature is then reviewed, a complete article having appeared in 1902 by Fouchard when thirty-seven cases were reported. To date some eighty cases have been reported.

There are two types: (1) complete when the whole scalp is torn away and (2) incomplete when the scalp is still retained by a pedicle to the neighbouring tissues. The former is the more frequent composing sixty-seven of the eighty cases reported to date.

As a rule it is the skin which is detached but all the subjacent tissues may be involved even to avulsion of the pericranium. The involvement of the tissues depends on the nature, direction and force of the injuring agent. Sometimes there is scarcely any bleeding although in one case death occurred within the first twenty-four hours from hæmorrhage and shock.

The first period past, a large granulating surface is left which invariably suppurates. Delbet says that spontaneous cure is impossible. The author's prognosis is always guarded as eight deaths occurred in the sixty-seven complete avulsions and one in the thirteen incomplete, making a mortality of 11·2 per cent.

Treatment: Incomplete—Careful shaving, soap, alcohol; careful suturing with drainage. Numerous cases are cited showing primary union, although hæmatoma, deficient blood supply and suppuration are very often causes of failure. For an end result in several of these cases skin grafting was the final procedure.

Complete. Treatment of these cases is entirely different. Suturing of avulsed scalp is illogical and physiologically false as nutrition of the scalp is entirely from the periphery. Sixteen cases were attempted with failure in all. In author's opinion it is a dangerous procedure to cover a wound, which is impossible of complete disinfection, with material destined to become gangrenous. Lairsen reported a case of reimplantation followed by gangrene, osseous necrosis and fatal meningitis. Autoplastic pediculated flaps do not give good results as the whole surface cannot be covered in this manner. The author recommends dermo-epidermic grafts 3 by 4 cm. in breadth and 10 to 15 cm. in length, to completely cover the whole surface (Thiersch).

Results are usually good (with rare failures), sixteen to twenty-four months being required for permanent cure.

R. B. M.

hymogenous Dyspnœa and Thymectomy.

Boyadjaff Pierre: *Internat. Clin.*, 1920, Vol. 3, p. 80.

Thymogenous dyspnœa is more frequent in young children aged two to four months, but occurs in children up to five years of age. The acute type is more commonly observed, with dyspnœa and occasionally cyanosis and puffiness of face: there is free expiration but inspiratory stridor; hoarse cough and abdomino-cervical tugging. These symptoms temporarily subside if the child's head is bent forward while in sitting posture. Palpable episternal bulging: abnormal dullness over upper chest in mid-line, with shadow under the *x*-ray are valuable signs. A differential diagnosis is made from congenital defects in epiglottis and pharynx by direct examination of the latter. A chronic type is described where the symptoms are essentially the same as in the acute but milder in degree.

The cause of death in both types is mechanical from the wedging of the enlarged gland into the sterno-costo-vertebral ring thereby pressing on the trachea and the phrenic and vagus nerves, as well as producing congestion and œdema of larynx—(death from strangulation).

Metabolic intoxication has been suggested as the cause, but the author prefers the mechanical explanation.

Treatment. Under general anæsthesia: (ether or chloroform, open method). Operation. A vertical incision is made in mid-line above the supra sternal notch; separate the muscles; expose trachea, incise capsule of gland bulging above sternum; seize the gland substance gently but firmly and remove by cautious dissection seizing and tying vessels as they are exposed. Close the wound by suturing the separated muscles and apply dry dressing.

Results are excellent, and there is immediate improvement of all symptoms. No untoward changes were noted in the general nutrition of patient.

Intubation is not recommended either to relieve symptoms or as part of the operative technique. *X*-ray treatment has been observed to be not only valueless but dangerous. A. D. C.

SURGERY OF THE ABDOMEN, GASTRO-INTESTINAL TRACT AND PERITONEUM

Congenital Atresia of the Œsophagus.

Kastner, Alfred L.: *Arch. Pediat.*, Nov., 1920.

The author contends that while congenital atresia is rare, it is not unknown, and that if looked for more diligently it would more often be recognized

The pathology is curiously constant. There is an upper blind pouch extending from a normal pharynx into the mediastinum. There is then a gap, closed sometimes by a solid cord between the upper and the lower portions of the œsophagus. The lower portion opens through a slit into the trachea just above the bifurcation.

The clinical picture is equally constant and typical. The description is graphic.

From birth the baby's mouth seems filled with excessive mucous which dribbles, or collecting, causes violent choking attacks from which the infant recovers. Food is taken greedily but is at once returned.

The stomach is distended with air, in contrast with the rest of the abdomen which is flat. A catheter introduced into the mouth stops at 12 cm. The normal distance to the cardia is 17 cm.

No case is known to have lived more than two weeks. A gastrostomy at once floods the lung with the fluid introduced into the stomach by way of the opening into the trachea.

F. A. C. S.

The Causation of Appendicitis.

Short, A. R.: *Brit. Jour. Surg.*, Oct., 1920, Vol. 8, p. 171.

The author contends that appendicitis was relatively rare until 1895, when there appeared a very definite increase in the disease which continued until the year 1905. After this date the incidence has remained fairly stationary. Facts and figures are brought forward to prove that the increase was not due to more thorough methods of diagnosis or to a realization of the importance of the symptoms.

He found that inmates of institutions on a somewhat plain diet were relatively immune, while amongst the better classes the disease was quite common. Certain primitive countries appear to be immune. In wild animals it is rare, but is quite common amongst animals in captivity, especially apes.

The writer believes that the most probable explanation of the increase during 1895-1905 is to be found in some change in the food habits of the people during that period. He has made a very careful review of all our principal foodstuffs and comes to the conclusion that the lack of cellulose in our diet may be the important factor.

G. A. F.

Post-Operative Mortality in Appendicitis.

Brown, H. B.: *Lancet*, Jan. 15th, 1921, p. 118.

Death from appendicitis is most frequent between the ages of five and twenty. Death in a neglected case occurs when appendectomy is performed on the fifth or sixth day. By the fifth to sixth day an abscess wall has already been formed and by removal of the appendix the walls of abscess are disturbed. In twenty-four hours following operation, the patient manifests the signs of bacteræmia which leads to fatal issue.

The author states that abscesses do not rupture spontaneously into abdominal cavity if patient is kept at absolute rest in bed. His procedure of choice is to wait until acute symptoms have subsided then operate, open the abscess cavity and drain. The appendix is removed later.

In cases where gangrene of appendix is unaccompanied by abscess formation early appendectomy is imperative. A. D. C.

An Unusual Tumour of the Stomach. (Granuloma).

(D'une curieuse tumeur de l'estomac (Granuloma). Vullet, M. H.: *Rev. Med. de la Suisse Rom.*, Dec., 1920, p. 806.

Dr. Vullet reports the case of a man who has suffered with gastric symptoms for the preceding three and a half years. Physical examination of the patient revealed a movable tumour in the left upper quadrant of the abdomen. Examination of stomach contents showed hypochlorhydria and the presence of lactic and butyric acids. No retention. At operation a tumour was found inside the stomach, hanging down from the lesser curvature, like the tongue of a bell. The tumour was completely covered with mucous membrane, and was situated in the submucous coat. The muscular coat was hypertrophied. The tumour was easily removed. The post-operative course was uneventful, and the patient has been in good health ever since (i.e., two years). The microscopic examination of the tumour showed it to be a non-specific granuloma. J.G.W.

The Treatment of Gastric and Duodenal Ulcer

(Zur Behandlung des Uleus Ventriculi et Duodeni). Eiselberg, A.: *Arch. f. Klin. Chir.*, Oct., 1920, Vol. 114, p. 35.

During the past year many surgeons have abandoned the operation of gastro-enterostomy and have practised the more radical procedure of excision of the ulcer with the whole ulcer bearing area because of the recurrence of hæmorrhage and ulcer following upon the former operation.

The following data are of interest. During the first years of the war the number of cases seeking relief from gastric symptoms notably diminished but increased during 1918 and is still increasing Admitting that there are many reasons for the increase of such diseases one may deduce that possibly the war nervousness produced in men plays some part. In the author's experience gastric ulcer is far more frequent in men than in women. What the uterus is to the hysterical woman, the stomach is to the nervous man (Gelpke)).

Of one hundred and ninety-two operative cases of ulcer of the stomach treated since August, 1918, thirty-four were pyloric, sixty-four duodenal and ninety-four pre-plyoric. Clairmont for many years has declared that in these pre-pyloric ulcers, gastro-enterostomy does not improve the patient but tends to the development of other ulcers.

In the author's clinic, out of sixty-four cases submitted to gastro-enterostomy with pyloric occlusion, ten required secondary operations for ulcer of the jejunum. Schnitzler pointed out that when a large part of the stomach is resected with the ulcer, the acidity is reduced, and ulcer is not likely to follow.

The advantages of the radical operation (Bilroth II Method) are therefore: (1) extirpation of the ulcer, (2) reduction of the hyperacidity.

We have seen the results of the gastro enterostomies for a period of twenty years with their vicious circles, and peptic ulcers. The results of the radical operation are sufficiently gratifying to give it a more extensive trial, not forgetting the post-operative medical treatment of rest for the stomach and a careful diet.

A. B. I.

Intra-Abdominal and Intra Pelvic Adhesions.

Spalding, Clement B.: *Internat. Clin.*, 1920, Vol. 3, p. 193.

Causes: (1) Inflammation, bacterial in origin: (2) injudicious manipulation of viscera; (3) introduction of foreign substances, e.g., oil, etc., into the peritoneal cavity; (4) trauma from without, as in forcible reduction of hernia; (5) idiosyncrasy.

Adhesions are benign in their intent, being absorbed spontaneously in 40 per cent. of cases.

Symptoms: Pain in abdomen with fixation of certain abdominal organs, and partial or total entero-stasis. Adhesions are less common in upper abdomen but when present may give rise to gastro-enteric symptoms. Pelvic adhesions are recognized by inelastic pelvic floor, fixed cervix and by the presence of tumour mass.

Treatment: Prophylactic (1) care in history taking and accurate diagnosis thereby limiting abdominal exploration; (2) avoiding the spread of infective material by packing off with gauze; (3) avoiding unnecessary sponging—never use dry sponges; (4) avoiding introduction of chemicals into abdominal cavity; (5) covering all intra-abdominal wounds with omentum or mesentery or where indicated with omental grafts; (6) avoiding use of drains, if possible, but where necessary these should be rubber or covered with rubber tissue; (7) employing post-operative posturing; (8) establishing early peristalsis; (9) not using oil in any form in abdominal cavity, as this causes rather than prevents adhesions; (10) if any foreign agent or chemical be employed in the prevention of adhesions ether is said to be sometimes of value. A. D. C.

SURGERY OF THE BILIARY TRACT

The Question of the Ideal Cholecystectomy

(Zur Frage der idealers cholecystektomie). Haberer: *Zentralblatt f. Chir.*, Dec. 18th, 1920, p. 1530.

Haberer speaks of the 'ideal cholecystectomy" as one in which the abdominal wound is closed without drainage.

In seventy-one cases of excision of the gall-bladder within the past two years thirty-one were done by the ideal cholecystectomy method. In none of them was there indication for drainage, i.e., definite abscess. In three of these cases resection of the stomach for ulcer was performed, in five the appendix was removed, in one, on account of pyloric stenosis, a lateral gastro-duodenostomy was necessary. In three cases of empyema of the gall bladder the same operation was not contraindicated. The remainder were cases of a more or less chronic nature, as, cholelithiasis with adhesions to the neighbouring organs. In one case notwithstanding a diffuse purulent peritonitis, the operation was carried out.

Briefly the operation consists of a midline, or right rectus incision, the gall bladder is freed, the hepato-duodenal ligament raised and carefully divided. The hepatic duct is examined for stones and the gall bladder sub-peritoneally shelled out. The cystic artery is tied and cut; the cystic duct is clamped with two fine forceps and divided with the electro-cautery; the stump is tied with silk and covered with peritoneum and buried under the hepato-duodenal ligament which is reunited with silk The rest of the operation is well-known—the abdomen is closed without drainage

Thirty out of thirty-one cases had an undisturbed recovery In one after fourteen days—the wound being healed—there developed a colicky pain which necessitated re-opening, and a stone was removed from the common duct.

A. B. I.

SURGERY OF THE BONES AND JOINTS

Repair of Bone following Fractures.

Blake, J. A.: *Arch. Surg.*, Jan. 1921, Vol. 2, p. 37.

The author emphasizes the prime importance of nutrition in the repair of fractures Small detached fragments may if not infected unite with rapidity, and with the production of much callus. When infected these detached fragments will die. In portions of the bone not destroyed the presence of infection produces hyperæmia and stimulates excessive callus with rapid bone production. This is frequently responsible for the bottling up of dead fragments which in general should be removed as soon as detected. If, however, an exuberant callus is desired to bridge a defect, it may be wise to leave the sequestrum undisturbed, on the analogy of the stimulus to osteogenesis exerted by a bone graft, even if of dead bone.

A sequestrum as seen in skiagrams preserves its density for a long time, often casting a shadow much darker than the surrounding active bone. This increased comparative density is of diagnostic value, particularly if a dense area with sharp and irregular contours is surrounded by a clear interval. He refers to the observations of Kenneth Taylor, that whereas bacteria invade the canaliculi, osteoclasts do not, hence what sequestra lose by absorption, if any, is entirely from their surfaces.

Rarefaction is always present in fractured bones and is due to disuse rather than to infection: the latter playing its part rather by limiting function than as a direct toxic factor.

Operation for non-union should be delayed when marked rarefaction exists in one or both main fragments. An apparatus permitting use of the limb, if applicable, will improve the circulation and nutrition. An inlay graft is not suitable for these cases but is indicated when the ends are rounded and the medullary cavity plugged: evidences of reparative power

A fracture should be reduced as soon as possible. Repair in recent fractures is rapid, new bone appearing early and the healing of soft parts may interfere with reduction if postponed. The production of new bone does not go on forever and reparative power should be conserved not wasted.

Suspension with early mobilization of contiguous articulations favours circulation, reduces swelling, expedites repair and lessens the frequency of rarefaction and non-union. The better condition of the soft parts is an index of the better condition and nutrition of the bone.

The strain of weight bearing should not be allowed until the new bone has established its adult condition as evidenced by the re-establishment of the Haversian systems, which can be determined by rœntgenograms. F. J. T.

Osteomalacia (so-called) of Famine.

L'Osteomalacie (dite) de famine. Cramer, Alec. and Schiff, Paul: *Rev. Med. de la Suisse Rom.*, Nov., 1920, p. 746.

In 1919 the doctors of Vienna and of various parts of Germany described a disease accompanied by osseous changes, and supposed to be due to the food conditions existing in those countries. In May, 1920, the disease appeared in Russia.

Although somewhat allied to true osteomalacia and late rickets, the disease shows some very important differences, which warrant it being classified as a separate entity.

It is usually seen in females after the menopause (75 per cent. in females, of whom 60 per cent. were past the menopause). The onset is insidious, being characterized by vague pains, not specially referred to the bones This stage may last several months, when the course becomes more active. The pains become worse and are referred to the bones. The patients notice that they cannot walk up and down stairs. Kyphosis develops rapidly in the course of a few weeks. In severe cases the patients are confined to bed. The bones all become soft and mould easily.

The cardinal symptoms are: (1) Pain in the ribs, most marked in the seventh and eighth. The ribs become extremely soft and are easily moulded with the hand. This is an early and constant symptom.

(2) The gait, which is of a peculiar waddling character, like that of a duck, i.e., slow, short, painful, careful steps. The pelvis moved "en bloc." There are no characteristic blood changes, and no abnormalities of the urine, with the exception of slightly increased elimination of calcium.

The question of the endocrine functions is carefully gone into, as is also the metabolism, more particularly that of calcium and phosphorus and CO_2.

The *x*-ray changes are very marked and diagnostic. They show an extreme rarefaction of the bones with the exception of those of the cranium and face. In the long bones the changes are most marked at the juxta-epiphyseal line. The post-mortem findings are carefully described and the differential diagnosis is discussed at length.

The cause of the disease is considered to be due to the lack of nourishment over a prolonged period, more particularly of those foods which are rich in mineral salts, i.e., milk, eggs, and fresh vegetables. The disease responds readily to treatment. Ordinary diet with the addition of 3 grammes of calcium chloride and 3 milligrammes of phosphorus per diem being all that is required. The phosphorus is best given in the form of phosphorated cod liver oil.

The authors give a very complete report of a case treated in their clinic There is a very full bibliography of the subject attached.

J. G. W. J.

The Nature of Arthritis and Rheumatoid Conditions.

Pemberton, Ralph: *Jour. Amer. Med. Assoc.*, Dec. 25th, 1920, Vol. 75, p. 1759.

Focal infection should not be considered the only cause of arthritis. Diminished metabolism seems to excite arthritis, and *x*-rays, radiotherapy, heat, massage and exercise in all probability are beneficial to arthritis by advancing metabolism. Arthritics show a lowered sugar tolerance more or less proportional to the severity of the disease. Lowered sugar tolerance is also found in thyroid conditions, nephritis and cancer, and is probably evidence of disturbance of the oxidative or combustive processes. Hence the sugar intake may in certain arthritic conditions be reduced to suit the burden to the capacity of the organism, and the author suggests that the joint improvement following an operation under ether may in some cases be due simply to starvation. He notes that diabetics in the stage of sugar tolerance are unusually free from rheumatoid conditions. Arthritis coming on during convalescence from a severe illness (influenza, dysentery, etc.) may be due to the increased food intake to an amount too great for the system to handle, hence lowered sugar tolerance and with it a rheumatoid condition. Joints have a notoriously poor blood supply, hence suffer early from low metabolic activity. Massage is beneficial because it stirs up the glycogen metabolism of the muscle. Oxygen delivery to various parts of the body (by hæmoglobin) varies, and may be lessened by cold and exposure chilling the blood in a given area. Thus metabolism is lowered and the joints suffer first. Hence beneficial effect of hyperæmia.

Treatment should involve not only removal of focus of infection but the burden of food intake should be adjusted to suit the altered metabolism. The caloric intake of the patient should be determined and reduced if too high.

J. A. N.

Amputations. Corner, E. M.: *Lancet*, Jan. 15th, 1921.

The writer calls attention to the fact that there must be a closer relation between the surgeon and the artificial limb maker. In other words better results can be optained when it is possible to fit certain artificial limbs. He emphasizes that fewer amputations need to be taught to students. He is a strong advocate of the high Syme discarding other amputations from metatarso-phalangeal to the high Syme. He is against the Stokes-Gritti, and a strong advocate for Huggins' hip amputation, and Spence's shoulder. He makes a strong point of the painful stump and unjust "malingering' and proper treatment of neurasthenia in these cases. Light metal limbs are advocated. W. G T.

Congenital Syphilitic Epiphysitis in Adolescence. Gaenssten, E. J. and Thalkimer, Wm.: *Amer. Jour. Orthop. Surg.*, Jan., 1921. Vol. 3, p. 2.

The authors point out that congenital syphilitic epiphysitis is usually described as appearing in the first few months of infancy. They describe a case occurring in a white boy of thirteen, with the reasons for which it was considered syphilitic

The patient complained of pain and lameness in the left hip, following trauma. As there was found decided weakness of leg and thigh, with one-half inch shortening, loss of reflexes and moderate atrophy, it was thought to be a case of mild poliomyelitis. Measures taken to restore muscular power were followed by gradual improvement. No *x*-rays were taken at the time. One year later the pain returned. An *x*-ray of the hip showed a rather flattened trochanter with diffuse areas of rarefaction scattered throughout it and the adjacent portion of the femoral shaft. Epiphyseal line could not be made out. On the assumption that the condition was one of low grade infection the trochanter was opened The areas of rarefaction were found to be due to cartilaginous masses in the midst of the cancellous bone. Little help was obtained from microscopic examination of specimens removed, but in the meantime the pain left. A return of symptoms eight months later led to further study of the case, when it was discovered that periosteal thickening existed along the femoral shaft, in which obliterating endosteitis was found. The Wassermann previously negative, was now four plus, and the pain was promptly relieved by anti-syphilitic treatment. The weakness of the leg was thought to be Parrot's syphilitic pseudoparalysis A history of syphilis in the father was obtained.

J. A. N.

SURGERY OF THE NERVOUS SYSTEM

Intracranial Injuries in the New Born. Bailey, Harold: *Amer. Jour. Obst. and Gyn.*, Oct., 1920, Vol. 1, p. 52.

The paper is based on the study of three hundred and forty-one cases of still-born infants. In one hundred and ten the labour had been obstructed or protracted

Literature is quoted establishing abundantly that intracranial hæmorrhage due to traumatism during birth is common; that it is a frequent cause of death, and of morbidity if the children survive.

Considerable support is given to Little's contention that asphyxia alone may cause cortical hæmorrhage. Other causes are compression of the head, and over-riding of the sharp edges of the cranial bones which thus may tear the cerebral veins leading to the longitudinal sinus, during the passage of the head through a small pelvis. Another frequent cause is pressure from forceps. Where the injury is great little can be done. In operable cases large plastic flaps have not proved of value owing to the high mortality. The author favours sub-temporal decompression with drainage

Depressed fractures should be elevated and if associated with signs of intracranial pressure the dura should be exposed and incised if there is evidence of subdural injury.

Emphasis is placed upon the frequency of the occurrence of these lesions and their ætiology in asphyxia and pressure. F. A. C. S.

Traumatic Epilepsy following War Wounds of the Head (Zur Frage der traumatischen Epilepsie nach den Schussverletzungen des Krieges und ihrer Behandlung.) Guleke: *Arch. f. Klin. Chir.*, Oct. 22nd, 1920, p. 764.

Guleke confines his remarks to a discussion of a few of the main points. In his experience epilepsy most often occurs in cases in which the loss of bone is small, the large defects showed the complication less often. It being granted that the cause resides in a cortical scar, involving the meninges as well, he conceives that with small defects a circumscribed area of the cortex is, as it were, hung up to the bone by the scar, and that this fixation is quite unyielding, so that the respiratory and circulatory movements of the brain bring about a continual tug upon the cortical area concerned. On the other hand, where the loss of bone is extensive, the scar, particularly in its centre, is much more yielding and the movements of the brain are less interfered with.

The retention of foreign bodies in the brain, in his experience, does not render the patient more liable to epilepsy.

In the matter of treatment he agrees with Lexer and others that the cortical scar should be excised into healthy tissue and the space left should be filled with a free fat transplant. While some proceed in the same sitting to fill the bony defect by plastic operation on the cranium, Guleke finds it better to do this six months later. In a few cases the transplanted fat degenerates into an oily fluid but in the majority he finds that it lives. In any case it is the best material available to prevent fresh adhesions. In fifty cases it happened only once that the transplant was discharged through the wound, and in this there was some infection.

As to results he is obliged to report that in two-thirds of the cases the operation brought about no improvement in the epilepsy. Of those that were improved he found that the scar in the majority involved the motor region. Operation should not be done soon after the injury inasmuch as early epileptic attacks quite frequently cease for good. If they continue after six months operation is fully justified. E. A.

Nerve Suture: An Experimental Study to Determine the Strength of the Suture Line. Miller, E. M.: *Arch. Surg.*, Jan., 1921, Vol. 2, p. 167.

In suturing nerves where large gaps exist, it is frequently necessary to posture the neighbouring joints in extreme flexion in order to permit approximation of the separated ends. With the object of determining the length of time during which such posture should be maintained Miller carried out a series of experiments on dogs investigating the breaking-point of the suture line at varying periods. Employing fine catgut or silk epineural sutures he found that the tensile strength of the suture line which increases most markedly during the second week shows a slight further increase during the third week, by this time becoming almost directly proportional to the diameter of the nerve. During the fourth and fifth week there is but little change. The epineural sutures play but small part after the second week.

After operating on the human sciatic nerve where flexion has been required he advises waiting six to eight weeks before extending the joint; four weeks in the case of the median or ulnar. F. J. T.

SURGERY OF THE VASCULAR SYSTEM

Resume of the Circulatory System. Review of the Literature of 1917, 1918 and 1919. Calhoun, Henrietta: *Amer. Jour. Dis. Child.*, Jan., 1920, Vol. 19, p. 62.

The retrospect covers normal and abnormal conditions of the heart and vascular system, including the physiological and therapeutic advances. The operation of heart massage, either extra abdominally by fingers beneath the costal arch or through an abdominal incision is recorded with several successful cases, even after periods as long as thirteen minutes after cessation of the heart beat.

Blood transfusion is briefly reviewed, and the superior longitudinal sinus route in infants is noted following Knox's first case reported in 1917. The work on the life of the transfused red blood cell—thirty days—total blood volume in health and disease; the coagulation time and the factors entering into coagulation are all discussed briefly and original references given.

Blood work in basal metabolism estimation in thyroid surgery is reviewed and the newer blood examinations noted. The retrospect covers the work on anæmias and leukæmias, and the annotated literature is complete and is readily available for each subdivision of blood-vascular work, and covers one hundred and twenty-three references to the literature. C. K. P H.

The Result and Feasibility of Treating Lymphangiomata with Injections of Boiling Water. Reder, Francis: *Surg. Gynæc. and Obst.*, Jan., 1921, Vol. 32, p. 70.

Lymphangiomata are uncommon The author had four cases in ten years' service in a hospital of one thousand beds.

Eight cases were injected with boiling water. All were benefitted, in none did the tumour entirely disappear. There was a most severe reaction in several cases, in one endangering life and in none were the good results seen as in similar treatment of hæmangiomata. The injection converts the soft mass into a hard firm mass into which no second injection can be forced. These tumours are very easily infected, lymph sinuses form and their surgical treatment is difficult. The hot water injection is to be undertaken with reserve and is often liable to produce severe local results with ultimate disappointment. When possible local excision is preferable. Excellent photographs of five cases are shown.

C. K. P. H.

SURGERY OF THE GENITO-URINARY SYSTEM

Kidney

Bilateral Renal Dystopia. Walther, H. W. E.: *Surg. Gyn. and Obstet.*, Jan., 1921, Vol. 32, p. 82.

Dr. Walther reviews the literature of misplaced kidneys, the symptomatology and embryology. He reports a case of bilateral dystopia of the kidneys where both organs were in the levis pressing on the vesical neck, causing retention of urine, trabeculations and diverticulum of bladder. Pyelographic picture shows the kidneys in the pelvis.

No operative treatment could be done, but patient improved on bladder drainage and became symptomless after a short treatment of drainage and lavage. R. E P.

Bladder

Emptying a Chronically Distended Bladder: Description of a Simple Device. Van-Zwalenburg, Cornelius: *Jour. Amer. Med. Assoc.*, Dec. 18th, 1920, Vol. 75, p. 1711.

The author draws attention to the evil practice of emptying a chronically distended bladder too quickly, and reports a case of chronic bladder distention in which he controlled the rate of the bladder outflow through a tied-in catheter and a length of rubber tubing, by hanging the outlet over the edge of a container at varying elevations above the base of the bladder.

The author commenced evacuation of the bladder with the outlet twelve inches above the base of the bladder and gradually lowered the can during the first forty-eight hours, when continuous drainage without any pressure obstacle was permitted. F. S. P.

Cystoscopy

The Wax Bulb Ureter Catheter for Routine Use. Keyes, Edw. L., Jr.: *Jour. Urology*, Dec., 1920, Vol. 4, p. 563.

The application of the wax bulb upon the ureter catheter first suggested by Dr. Howard Kelly for the detection of ureteral calculi through his open tube cystoscope, and later adapted to any type of cystoscope, has not had as great use as is desirable. This is due to the difficulty of avoiding cystoscope scratches and the complications in the cystoscopic procedure resulting from efforts to prevent such scratches.

Keyes has demonstrated by a few simple experiments that the cystoscope scratches are quite different from the scratches made by the calculus. He has therefore made it a part of his cystoscopic routine to attach the wax bulb to an ordinary catheter, the only precautions taken being to use a bulb capable of running freely through the cystoscopic channel, to thread the wax tip catheter backwards into the small channel at the ocular end of the cystoscope and to make sure that the wax bulb does not come into contact with the lever at the vesical end of the cystoscope. The catheter may be withdrawn after the withdrawal of the cystoscope, or the catheter and telescope may be withdrawn in one piece.

This method has been used as a routine by Dr. Keyes and several of his associates for the past year. No difficulty has been found in differentiating instrumental scratches from stone scratches. F. S. P.

SYPHILIS

Prophylaxis of Syphilis with Arsphenamin.

MICHEL, LEO. L. and GOORMAN, HERMAN: *Jour. Amer. Med. Assoc.*, Dec. 25th, 1920, Vol. 75, p. 1768.

THE authors call attention to a prophylactic measure of injecting arsphenamin in small doses in persons presenting no lesions, and who are definitely known to have been exposed to syphilitic infection. The prophylactic doses average 0.3 gm. of arsphenamin, the average number of doses being three. The authors merely refer to the fact that the method is likely to encounter objections, but do not deal with this point in detail. F. S. P.

Involvement of Nervous System During Primary Stage of Syphilis (continued study).

WILE, UDO. J. and HASLEY, CLYDE K.: *Jour. Amer. Med. Assoc.*, Vol. 76, p. 8.

FOLLOWING the work of Wechselmann in 1912 and Wile and Stokes in 1915, a study of the spinal fluid in two hundred and twenty-one cases of pre-roseolar syphilis was made. No cases presented any clinical evidence of syphilis except the primary sore and in one hundred and six the blood Wassermannn was still negative.

Of the forty-nine cases with abnormal spinal fluid, twenty-five had increase in albumen and globulin, twelve had pleocytosis and the Wassermann was positive in eight.

Marked improvement followed in these cases upon the institution of intensive anti-syphilitic treatment and they conclude that the abnormal spinal fluid is more the result of a transitory roseola of the meninges without subsequent damage, than to the advent of permanent neurosyphilitic involvement.

A. M. J. T.

The Urine in Syphilis.

KLAUDER, JOS. VICTOR and KOLMER, JOHN A.: *Jour. Amer. Med. Assoc.*, Vol. 76, p. 102.

URINARY abnormalities were found in three out of forty-three cases of primary syphilis and in four out of forty-six cases of secondary syphilis. Albumen was present in all cases, casts in all but two, and red blood cells in two cases. These abnormalities disappeared after anti-syphilitic treatment with arsphenamin and mercury. Urinary abnormalities are regarded as due to renal invasion by spirochæta pallida rather than to syphilotoxins. Spirochæta may be found in the urine of cases of acute syphilis. Complement fixation on urine is very apt to give falsely positive results. A. M. J. T.

Mercurial Stomatitis.

MAUREL (Gazette des Hopitaux): reported in *Urologie and Cutaneous Review*, Jan., 1921, Vol. 25, p. 44.

IN the poisoning due to mercury used as medicine, stomatitis is often the only manifestation and persists as long as the drug is administered. The different salts of mercury and the different modes of administration differ in poisoning effects. The biniodid in the form of Ricord's pills is well tolerated up to 4 or 5 centigrams daily, and sometimes as high as 10 centigrams. Corrosive sublimate in the form of Van Swieten's solution or Dupuytren's pills begins to produce stomatitis at 3 cg. a day. Mercurial inunction is more apt than any other method to produce stomatitis At six grams daily there is danger. It comes suddenly and is generalized, and is more grave and of longer standing. Injections of insoluble salts are more prone to produce stomatitis than injections of soluble salts. Among insoluble salts grey oil and calomel are two most important. Injections of soluble salts rarely produce stomatitis, still this eventually may arise with doses of .01 gram of the cyanide or of .02 or .06 of the benzoate.

Renal lesions, hypatic trouble, general health are all factors in mercurial stomatitis. Prognosis is variable; not grave except in very severe cases. It recovers spontaneously. Most authorities regard the disease as due to an infection with fusiform spirillum, but Vincent, Marfan, Paisseau describe many forms of bacteria. The kind of organism is still a mooted point.

Treatment should be prophylactic above all else. Never give a patient mercury without a careful examination of the teeth and minute directions to the patient as to the care of the mouth. Suspend treatment upon the slightest evidence of stomatitis. If stomatitis has occurred use chlorate of potassium both as mouth wash and internally. Or use alum 5 per cent. as mouth wash. Various internal medication has been advised, but the local treatment is the most important. Recently applications of arseno-benzol and its derivatives in powder have been recommended. K. I. C.

RADIOLOGY

X-ray Treatment of Tonsils and Adenoids.

Witherbee, W. D.: *Amer. Jour. Roentgenol.*, Jan., 1921, Vol. 8, p. 25.

In a series of sixty cases of hypertrophied tonsils and adenoids, treated with *x*-ray, Witherbee reports a decrease in the size of the glands: the evacuation of contents of the crypts, and in thirty-two out of thirty-six cases the disappearance of pathogenic bacteria as shown by cultures made from the tonsillar crypts. These changes begin about four weeks after treatment and are progressive for several weeks. The age of the patients treated ranged from sixteen months to fifty years.

The majority of his cases received one masssive dose, the following factors being used: 8″ S.G., 5 M.A., 10″ D., 3 M.M. of aluminum, and from three to seven minutes time for each exposure, depending on the age of the patient. In place of this massive dosage, the author now advocates a fractional dosage using, 7″ S.G., 5 M.A., 10″ D., 3 min. 18 sec. with 3 M.M. of aluminum, in four treatments at two-week intervals. Three areas may be treated, i.e., the skin surface over each tonsil and when necessary the upper posterior cervical region.

This method is of value in case of tonsillar disease associated with chronic endorcarditis, pericarditis, hemiplegia and conditions generally which contraindicate operative measures.

A. S. K.

Induced Atrophy of the Hypertrophied Tonsils by Roentgen Ray.

Murphy, Witherbee, Craig, Hussey and Strum: *Jour. Amer. Med. Assoc.*, Jan. 22nd, 1921, p. 228.

It has been noticed in the past that lymphoid tissue is much more susceptible to the *x*-ray than are the other tissues. Advantage is taken of this fact to reduce hypertrophied tonsils, their shrinkage being accompanied by the proper drainage of the crypts with resultant clearing up of the infections. The technique employed is as follows: "The patient is placed on a table in such a way that the ray enters under the angle of the jaw and penetrates through the soft tissues to the region of the tonsil. The area exposed on each side about three square inches. The spark gap, measured between points, is eight inches; 5 m.a. are used at ten inches distance from the target to the highest point of skin exposed. The time varies from three to seven minutes according to the age of the patient." The ray is filtered through 3 mm. aluminum. The report is based on the result of treatment of forty-six patients ranging from three and a half to forty-five years of age. No patient was treated during a time when the throat showed evidence of acute infection. In all but four cases a marked improvement was noted within two weeks. "During the period of atrophy (one to two months) the crypts opened and drained, and in all but a few cases, the exudate disappeared and the surface of the tonsil became smooth, pale and of a healthy appearance." J. D. M.

Roentgen Examination of the Urinary Tract made Opaque.

Braasch, W. F.: *Amer. Jour. Roentgenol.*, Dec., 1920, Vol. 7, p. 584.

Braasch suggests the use of the term 'urography" to represent the roentgenographic examination of the entire urinary tract, restricting the use of the terms "pyelography", "ureterography" and "cystography". As urography entails unusual and highly specialized technical difficulties, and unless judiciously employed is not without great dangers to the patient, its use should be confined to experienced urologists and roentgenologists working in close co-operation. Furthermore, it should be used only when the clinical diagnosis cannot be made without it.

Urography is contra-indicated: (1) when the patient is in advanced age, or greatly emaciated; (2) in cases of advanced bilateral renal disease; (3) when it is apparent that surgical treatment will be of no benefit.

The use of collargol has been discarded; its solutions are not really solutions, but suspensions and the undissolved silver particles act as foreign bodies in the kidney pelvis or glomeruli and frequently cause infection Thorium makes an admirable solution, but unfortunately occasionally has toxic effects and it is difficult and expensive to procure. Solutions of the iodides or bromides are now the most widely employed; they are cheap, easy to procure and cast excellent shadows, They may be slightly irritating, particularly if retained in the kidney pelvis. 5 c.c. to 10 c.c. usually will suffice, introduced by the gravity method. After the x-ray exposure is completed, it is advisable to remove the injected medium as completely as possible. Any medium if allowed to remain in the renal pelvis may be the cause of infection. Bromide or iodide solutions may cause irritation even without infection when retained in the pelvis. The advantages of the opaque solution are pointed out in hydronephrosis, neoplasm, nephrolithiasis, anomalies, vesical diverticuli and prostatic obstruction.

W. A. W.

The Red Blood Cell Content on Those Handling Radium for Therapeutic Purposes.

MOTTRAM, J. C.: *Arch. Radio. and Electroth.*, Dec., 1920, p. 194.

RADIUM workers suffer from leukopenia affecting polynuclears and lymphocytes; reduction to one-half is common The red cells are also reduced and the colour index is high The author describes in detail three fatal cases of anæmia occurring in radium workers. One case died in spite of three blood transfusions. Twenty days before death the red cells were 1,100,000 and the colour index was ·68, polynuclears 600, lymphocytes 600. The second case had a blood count of 800,000, colour index 1·3, leukocytes 1520. A third similar case is described. Non-fatal cases improved in their blood count after two months' holiday. The effect of two months' holiday in one non-fatal case was as follows: Before holiday, polynuclears 1,382, lymphocytes 778; after holiday, polynuclears 3,835, lymphocytes 2,665.

A. H. P.

Histological Changes in the Bone Marrow of Rats Exposed to the Gamma Radiations from Radium.

MOTTRAM, J. C.: *Arch. Radiol. and Electroth.*, Dec., 1920, p. 197.

TWENTY-THREE rats were taken, eight were used as controls and fifteen for exposures Exposures of from twelve to four hundred and sixty hours were given, using 160 mgm. radium bromide, filtered through 2.25 mm. of lead An exposure of twelve hours under these conditions is equal to one six-hundredth of a Rad (Prof. Ross, Middlesex Hospital). The central position of a cross section of the bone marrow was examined in each rat. Exposures up to forty-eight hours marked increased mitotic figures; often exposures of longer than forty-eight hours the mitotic figures decreased.

These results explain the blood changes found in radium workers, viz.: leukopenia and anæmia caused by interference with the output of blood cells from the bone marrow. Hard x-rays may effect bone marrow. From these findings one is led to infer that hard x-rays should be used on bone marrow in cases of spleno-myelogenous leukæmia.

A. H. P.

New Roentgenotherapy in Cancer.

SITTENFIELS: *Jour. Amer. Med. Assoc.*, Jan. 8th, 1921, p. 99.

MARKED advances in roentgenotherapy have been made in Germany during the last year and a half. These take the form of more powerful apparatus, operating with an intensity of from 180,000 to 220,000 volts; improved tubes to tolerate this high tension voltage; and improved methods of measurement of dosage and ray absorption in the deeper tissues

Three standard types of tubes are in use, the Lilienfeld, Muller Siede-röhre (water cooled), and the Fuerstenau-Coolidge These tubes are capable of operating with a sixteen to eighteen inch spark gap, and of running constantly for from eight to ten hours a day. It is found that, using such tubes and this high electrical tension, at a certain point of filtration known as the homogeneous point, an even and homogeneous radiation is obtained which cannot be altered qualitatively by further filtration. By means of such delicate instruments as the electroscope of Wulf, and the new iontoquantimeter of Szillard. the exact dosage, dispersion and absorption coefficient have been determined. It has been established that the exact dosage for carcinoma tissue is 90 per cent. of a skin erythema dose, for sarcoma 70 per cent., and for the ovary, 25 per cent. It is most important that all parts of the tumour receive an even and homogeneous radiation sufficient to destroy all the cancer tissue and thus prevent recurrence. By the pre-operative application of radiation, the danger of transplanting cancer cells during operation is mitigated. Clinical knowledge as to the location of the tumour and its biology must accompany the skill of the roentgenotherapist that he may intelligently select or combine surgery, radium and the roentgen ray. As examples of the results obtained: in the clinic of Opitz in Freiburg, the focal distance used is 50 cm., and four fields are radiated at one hundred and twenty minutes each, at one sitting of eight hours—result, no cancer of the uterus has been operated on here since January 1st, 1919. Wintz has radiated about 3,000 cases of cancer of the uterus in the last seven years. In about 70 per cent. of the cases of cancer of the body of the uterus the disease was arrested over a period of four years, and in the cervix cases 45 per cent. of the patients were alive after four years In cancer of the breast the tube distance is increased to 70 or 90 cm. from the skin and a filter of 0·8 mm. of copper is used. In the former case three hundred and twenty minutes treatment are necessary, and in the latter, five hundred and thirty-five minutes, or nearly nine hours.

Carcinoma of the prostate is treated like a carcinoma of the uterus Cases of osteosarcoma, osteomyelitis sinuses and fistula and tuberculous joints were treated with gratifying results.

J. D. M.

MEDICINE

Juvenile Tabes: Review of the Literature and Summary of Seven Cases.

Parker, H. L.: *Arch. Neur. and Psych.*, Feb., 1921, p. 121.

The features of the disease which Parker attempts to summarize are: The insidious onset, the lengthy and even latent course of the disease, during which time no subjective complaint may be made, in contrast to the frequent optic atrophy and total blindness that may occur. The frequency of incontinence of urine, the relative rarity of such striking phenomena as ataxia, girdle sensations and lightning pain, and finally the frequent paretic termination, are features that stamp juvenile tabes with a distinctive mark and distinguish it from the adult type.

G. S. M.

Epidemic (Lethargic) Encephalitis. Cultural and Experimental Studies. Preliminary Communication.

Thalhimer, William: *Arch. Neur. and Psych.*, Feb., 1921, p. 113.

Thalhimer confirms the results reported by Loewe and Strauss. The infectious agent is apparently constantly associated with epidemic encephalitis. It passes through a clay filter capable of holding back ordinary bacteria, the filtrate producing a disease in rabbits which is very similar to the clinical features of the human disease The microscopic brain lesions are identical with those found in fatal human cases. The virus has been passed through a number of series of rabbits. The virus belongs to the class usually termed "filtrable viruses".

By means of ascitic fluid tissue medium, an extremely minute filtrable organism has been cultivated. This organism has been grown from the brains of about 80 per cent. of the rabbits inoculated with filtered virus.

G. S. M.

Angina Pectoris. Electrocardiographic Study.

Willius, F. A.: *Arch. Int. Med.*, Feb., 1921, Vol. 27.

A critical study of one hundred and fifty cases of angina pectoris in detail has afforded some illuminating results. As the author points out, patients with angina pectoris occasionally do not present objective evidences of heart disease.

In his series, nineteen had aortic lesions, two had mitral stenosis, and the remaining one hundred and thirty-four indeterminate pathological lesions. Of this latter group, i.e., 86·5 per cent., a classification is difficult if one is to accept Allbutt's theory discrediting the coronary hypotheses.

Careful electrographic tracings are made with the resulting conclusions that no findings by the electrocardiogram are pathognomonic of the disease. In one-third of the electrocardiograms, T wave negativity was significant, and was regarded as an important abnormality. Abnormalities in the T wave contour, affecting both the positive and the negative wave, were considered very significant. Abnormal Q. R. S. complexes in all derivations of the electrocardiogram in 14·2 per cent. of the records.

The cardiac mortality of the complete group was 46·7 per cent., definitely contrasted by the higher mortality attending those patients having T wave negativity, (70·3 per cent.), and abnormal Q. R. S. complexes in all derivations (62·5 per cent.) of their electrocardiograms. The paper in all its details is well worthy of close study.

C. F. M.

Spirochetal Pulmonary Gangrene.

Fishberg, M. and Kline, B. S.: *Arch. Int. Med.*, Jan., 1921, Vol. 27.

In a very marked case of coalescing lobular and bronchial pneumonia of both upper lobes, and the right middle lobe, the ætiological factor was regarded as the spirochæta bronchialis of Castellani. An extensive gangrenous ulceration in the right lower lobe, associated with the consolidated lung, was the main habitat of the organism, which was easily found in smears from the sputum, and later from the gangrenous sections at post mortem. The diagnosis was made before death.

Ever since Oberemier reported the presence of spirocheta, or spirilla, in the blood of patients suffering from relapsing fever, many diseases have been found associated with germs of this species. Apart from syphilis, yaws, Weill's disease, and Vincent's angina, the more common pyorrhea alveolaris has been associated with a similar cause. The sputum of some forms of bronchitis have likewise contained spirochetes in large quantities, and at times the symptoms have resembled those of pulmonary tuberculosis.

Castellani in Ceylon came to the conclusion after much observation, that there was a definite form of bronchial and pulmonary disease caused by spirochetes, and to this he gave the name of bronchial spirochetosis. Since that time, many other cases have been recorded.

During the recent war similar observations have been made, more especially among the tropical troops brought to Western Europe.

In making an ætiological diagnosis of this condition in the lungs, it is well to remember that spirochetes are sometimes normally present in the mouth. Where, however, their preponderance is overwhelming in the sputum of pulmonary infections, there would seem to be no reasonable doubt as to their ætiological importance.

C. F. M.

Bronchial Asthma: Response to Pilocarpin and Epinephrin. Alexander, H. L. and Paddock, R.: *Arch. Int. Med.*, Feb., 1921, Vol. 27.

A detailed study of a large series of cases of bronchial asthma has been made by the authors in the hope of correlating the findings which all, or nearly all, might present.

Asthma has been considered due to many causes, among which may be mentioned vasomotor neuroses, exudative diatheses, increased tone of the vagus nerve, sensitiveness to foreign proteins, to disordered metabolism, bacterial infection of the respiratory tract, and to certain abnormalities in the nose.

Very thorough examination of twenty cases failed, however, to reveal either by physical examination, routine laboratory tests, or drug tests, any constant associated condition. The most frequent finding was abnormal increased sensitiveness to pilocarpin. Such cases frequently present constitutional defects (status lymphaticus), and abnormal reactions usually described as characteristic of the condition called vagotonia. The majority of cases reacted to epinephrin, with an abnormal rise in blood pressure, and other characteristic signs,—pallor, tremour, sometimes rigor,—denoting increased sensitiveness to this drug.

The relation between low blood pressure and epinephrin reaction was apparent, while the smaller number of cases with normal or high blood pressure gave regularly normal reactions.

In the treatment of these cases it was found that patients reacting excessively to epinephrin were relieved by 0.25 c.c., a much smaller dose of the drug than is usually employed. C. F. M.

Experimental Studies in Diabetes. Allen, F. M., *Amer. Jour. Physiol.*, Jan., 1921, Vol. 54.

The Influence of Cold on Diabetes

Working upon a series of twenty-four dogs rendered almost diabetic by removal of pancreatic tissue the author attempted to determine whether cold in itself would render the animals diabetic. One-half of the animals were kept out-of-doors during the winter in New York, while the remaining half were kept in a building at room temperature. His conclusions were that there was no greater tendency for those outside to become diabetic. Cold in certain instances does produce hyperglycæmia and glycosuria, but it is due to a decreased ability on the part of the tissues to burn carbohydrate *per se* without any direct depression of pancreatic function.

The Influence of Pregnancy Upon Diabetes

Working with dogs rendered almost or definitely diabetic and subsequently pregnant the following conclusions were considered justified.

1. Probably no appreciable quantity of internal pancreatic secretion passes from fetus to mother.

2. There is a slight lowering of the carbohydrate tolerance during pregnancy, but this is slight for pregnancy failed to produce diabetes in

a dog where removal of 0.1 gram of pancreatic tissue sufficed for that purpose.

3. Experiments support Joslin's contention in the feasibility of completion of pregnancy by diabetic women under suitable conditions of treatment. E. H. M.

Source of Uric Acid Excreted in the Urine after Atophan.

GRAHAM, G.: *Quart. Jour. Med.*, Vol. 14, p. 10.

IT has been well known that in gout, atophan increases the output of uric acid in the urine. Likewise sodium salicylate, aspirin, and sodium benzoate render the kidneys more permeable for uric acid. But the actual reduction in blood uric acid is not sufficient to account for the increased output. Where does the "extra" uric acid come from? There are two possible sources for this uric acid: (1) the uric acid held in solution in the tissue fluids; (2) the uric acid deposited in the joints and tissues of the body. Studies of the author on an advanced case of gout would indicate that the "extra" uric acid came from that held in the tissue fluids, by passing into the blood stream as the concentration in the latter became lowered. Any evidence that uric acid already deposited in the tissues can be redissolved is lacking. E. H. M.

Mechanism of Urea Excretion.

OLIVER, J.: *Jour. Exp. Med.*, Feb., 1921, Vol. 33, p. 177.

THE author reviews the theories of the mechanism of renal excretion and discusses the improbability of a purely physical filtration through the glomerulus with secondary resorption of fluid by the convoluted tubules. Urea is a "non-threshold" substance passing into the glomerular filtrate in the same concentration that it is found in the blood. With a blood urea of 0.07 per cent., to obtain a litre of urine with a urea concentration of 5.5 per cent. it would necessitate the absoprtion of 77,500 c.c. of water by the tubules. By injection experiments with xanthydrol, which with urea forms a characteristic cystal, urea concentrations higher than those in the blood were demonstrated in the cells of the proximal convoluted tubules. Such findings can be explained only by an active secretion on the part of these cells. E. H. M.

Diagnostic Significance of Abdominal Pain in Children.

HUTCHISON, ROBERT: *Brit. Med. Jour.*, Jan. 1st, 1921.

"ABDOMINAL pain in a child must always be a source of anxiety to the doctor. It may mean so little or so much." This subject is divided by Hutchison into two main classes:

1. Extra abdominal causes of pain, under which heading he discusses pain caused by spinal caries, herniae, hip disease, herpes zoster and thoracic conditions such as acute pneumonia.

2. Intra-abdominal causes of pain. This is further divided into (1) cases of sudden or catastrophic pain, and (2) cases of chronic or recurrent pain.

Under subdivision (1) are considered such conditions as *acute indigestion*, appendicitis, or some form of acute intestinal obstruction, of which that due to intussusception is specially frequent in the child. Among the rarer causes to be considered are Henoch's purpura and renal colic.

(2) Chronic or recurrent pain is considered by Hutchison to be almost invariably caused by one of the following: (a) ordinary colic; (b) "umbilical" colic (first described by Moro); (c) enterospasm; (d) chronic obstruction; (e) appendicular pain; (f) causes in the urinary tract such as kinking of the ureter and ureteric calculus.

H. P. W.

News Items

ONTARIO

Interim Report of the Special Committee of the Council of the Academy of Medicine, Toronto, on the Glover Serum

Your committee begs leave to present an interim report as follows:

At its first meeting, October 11th, 1920, the members of the Committee were unanimously of opinion that it would be impossible to estimate the value of the treatment on the basis of the examination of 15 cases selected by Dr. Glover from among the large number to whom the serum had been administered. Such a superficial and incomplete investigation would be of no scientific value, and therefore unsatisfactory alike to the Medical profession, to Dr. Glover and to the public at large. It was therefore recommended that the scope of the committee be enlarged so as to include the examination of all available data, experimental and clinical, upon which Dr. Glover had based claims, which if substantiated, would mark an advancement in our knowledge of the causation and treatment of cancer of the greatest importance. Your committee accordingly communicated its views to Dr. Glover, who previously had promised the Academy to present to the Fellows at an early date the results both of his experimental and clinical work.

The Council of the Academy approved of the wider scope of the investigation advised by the Committee, and also of the collaboration of a number of eminent authorities in other centres, in the consideration of the data obtained by the Committee and in the preparation of the report to be based thereon.

In view of the interest manifested both by the medical profession and the public, and the hope which had been aroused that an important contribution had been made to our knowledge of the causation and treatment of cancer, your Committee was impressed with the necessity for proceeding with care and thoroughness to collect all available facts, to examine them critically but with open minds, in order to appraise as accurately as possible the value of Dr. Glover's work.

The claims which have been made by Dr. Glover may be considered under two headings:

(A) Experimental.
(B) Clinical.

(A) *Experimental claims.*

(*a*) That Dr. Glover has cultured cancerous cells and from them has isolated and cultured an intracellular organism which he has found confined to and present in every type of cancer.

(*b*) That by inoculation of these cells and organisms, cancer has been produced in a number of animals, including pigeons, rats, mice, rabbits, guinea pigs, hens, etc., and that a number of medical men including the Deputy Minister of Health of Canada, Dr. J. A. Amyot, had examined this material.

(*c*) That by the injection of cultures of these cells and organisms "into the jugular vein of a horse of the roan type between the ages of seven and nine years" a serum has been obtained which when injected into experimental animals, renders them immune to inoculation by the cancer cells and organisms before mentioned. In other words, while the animals not treated by the serum develop experimental cancer, those previously treated by it are immune.

(*d*) That the serum injected in cases of human cancer has been found capable of producing improvement or cure.

Your committee, therefore, regrets to report:

(1) That Dr. Glover refused to permit a visit to his laboratories by representatives of the committee.

(2) That he refused the request of the committee to be allowed to examine his cultures and experimental material at present available.

(3) That he has not acceded to the request of the committee to demonstrate his ability to culture cancer cells and organisms.

(4) That he has not acceded to the request of the committee to demonstrate his ability to produce cancer by inoculation, or to immunize animals against it.

Your committee therefore has no evidence to substantiate Dr. Glover's claims on the experimental aspect of the question under investigation.

(B) *Clinical claims.*

Your committee has endeavoured to collect information which would enable it to decide:

(*a*) Whether Dr. Glover has succeeded in producing cures in cases definitely established as cancer (1) regularly, (2) occasionally.

(*b*) Whether his serum produces improvement in cases definitely established as cancer, beyond that which occasionally occurs spontaneously or under palliative measures.

In order to answer these questions, your committee:

(1) Has examined twelve of the fifteen cases selected by Dr. Glover and asked for an opportunity for re-examination of them in order to follow their course.

(2) Has sought to obtain from the medical attendants of patients, confirmation of diagnosis and a statement as to the clinical condition of the patient before applying to Dr. Glover for treatment.

(3) Has obtained from St. Michael's Hospital through Drs. J. D. Loudon and J. M. McCormack a list of cases treated in that institution. Only those cases were included in this list which had received at least five injections of serum.

(4) Has sought to obtain from Dr. Glover a complete list of the cases treated by him privately with notes of their progress and ultimate results obtained.

(5) Has sought to obtain from the Fellows of the Academy, from hospitals and from practitioners at large, reports of the results of the serum treatment in cases which had come under their observation.

From the data above mentioned, as far as obtained, the Committee has found no evidence to warrant the hope that a specific cure for cancer has been discovered by Dr. Glover, or that a cure has been produced by the serum in any case definitely established as cancer.

It has evidence on the other hand that many cases of cancer, both early and advanced, have progressed steadily downwards, the course apparently uninfluenced by the use of the serum.

In answering the question whether the serum produces improvement in cases definitely established as cancer, beyond that which occasionally occurs spontaneously or under palliative measures, the Committee is confronted with a number of difficulties attendant upon the estimation of the value of any new form of treatment.

These may be summarized as follow:

(*a*) Good results at times are obtained in cases supposed to be cancer, but in which the nature of the condition has not been established on incontrovertible evidence. In such cases, the usual conclusion of the medical attendant is *a priori* that his diagnosis was wrong, rather than that a cure of cancer had been effected.

(*b*) Sufficient time must elapse to judge of ultimate results. Temporary improvement frequently occurs after the removal of mechanical obstruction by operation or by sloughing of a cancerous growth.

(*c*) Retrogression or even spontaneous disappearance may occur in cases of cancer so that it is not uncommon to get considerable temporary symptomatic improvement apart from any treatment.

(*d*) Psychic influences are of great importance: this aspect of the case has been well emphasized by Weil, a well-known authority, as follows:

"Is it indeed, very remarkable that a patient who has been consigned to death as a victim of a hopeless malady, should regain his spirits and his appetite, when he is again confronted with the hope of a cure, and of the eradication of his disease? It is a phenomenon well-known to every student of the disease that a large proportion of cases responds in just this manner to any treatment which is offered them. Osler has described a case of cancer of the stomach in which the mere visit to a consultant of sanguine temperament, though poor judgment, whose assurance of the patient that there was no possibility of cancer, resulted in a disappearance of all the symptoms and

> a gain of eighteen pounds in weight. It is this psychic influence, which has occasionally deluded the honest student of cancer cure, and which has also so generously played into the hands of the dishonest."

It is scarcely necessary to point out that when an investigator claims to have made certain discoveries and these of fundamental importance, before they can be accepted by scientific men, the fullest opportunity must be afforded for investigating the data upon which such claims are based, with details of methods sufficiently definite to permit of the repetition of the experiments by independent workers, and that failure of an investigator to submit his work to the recognized canons of science must tend to its being discredited.

The data which your committee has been able to obtain have not convinced it that the results of treatment obtained by the use of Dr. Glover's serum are better than those obtained by similar methods introduced by others, and which have ultimately disappointed the hopes entertained of them.

In concluding this interim report, your committee wishes to state its readiness to examine any data not yet submitted, but which Dr. Glover may decide to place before it, and to collaborate in their findings with recognized authorities who have already expressed their willingness to do so or with others whom Dr. Glover himself may nominate.

All of which is respectfully submitted.

W. H. Harris, *Chairman*,
H. B. Anderson,
Herbert A. Bruce,
John J. MacKenzie,
Jabez H. Elliott (*ex-officio*),
Harris McPhedran, *Secretary*.

The undersigned who were added to the Committee concur in the above report:

Geoffrey Boyd
W. P. Caven,
A. Primrose.

Presented to the Council of the Academy and adopted, January 13th, 1921.

J. H. Elliott, *President*.
F. C Harrison, *Honorary Secretary*.

Petition from the Ontario Medical Association to the Government of the Province of Ontario

The Hon. E. C. Drury, LL.D., Premier of the Province of Ontario, and Members of the Cabinet;

Honourable Gentlemen:

We appear before you, not as a class desiring class privileges for our own benefit, but merely as a representative group of citizens realizing that we have a duty to perform in the interests of the community as a whole.

Our organization represents the members of the profession in Ontario, and it is definitely interrelated with the activities of local Medical Societies situated in the various parts of the Province.

Our Association is anxious to serve the community to the best of our ability, and we desire to definitely assist by actively co-operating with all recognized agencies interested in the preventive measures for Public Health, and for all those things which have to do with the betterment of medical service for the various individuals in the community.

In order that the best facilities for modern treatment be brought within the reach of all parts of the Province, the hospitals now in existence, or that may be brought into existence, should be assisted in every way to enable them to have efficient equipment with which to furnish the means of correct diagnosis and treatment. To carry out this idea, the hospitals of the Province should be carefully inspected as to the standardization of their scientific equipment, and as to what further equipment would be required to bring them up to a degree of modern efficiency.

During the last two years we have found it possible to enlist the co-operation of a very large number of the most progressive members of our profession, and we believe that we now have an organization, which, if assisted by the State along the lines herewith appended, can be of greater service to the community.

The chief points which we desire to bring to your attention, are:—

1. The advisability of making a survey of the amount of unattended sickness occurring in the Province.

2. The advisability of transferring the present nursing and medical school inspection from the

Department of Education to the Department of Health.

3. The real necessity for measures which will guarantee the continuous and efficient standardization of drugs.

4. The necessity for carrying post-graduate teaching to more remote places where the practitioners cannot leave their homes to attend the great institutions of learning.

These various problems have been discussed at County Society, and District meetings throughout the Province, during the past six months, and in addition a special meeting of our Association held in Toronto in December, 1920, instructed the Executive Committee to take some definite action. Thus we account for our presence here to-day.

In presenting this petition, we do so knowing that we have the complete endorsation of a large majority of the members of the profession of this Province.

1. The necessity for a survey of the total volume of sickness and the proportion of the same which is unattended for a more or less lengthy period in this Province, is suggested by the large number of rejections of those examined in recent years for admission to the Army, the proportion of rejections of adults applying for Life Insurance and the proportion of school children which physical inspection reveals to be below par.

2. While, at the present time, municipalities of 200,000 population in this Province are permitted by the Public Health Act to carry on through the local Boards of Health, the supervision of school medical and nursing service, it is believed that such work in all municipalities should be placed under the local Boards of Health, rather than under the Board of Education. In this way all public health work from infancy to old age would be carried on under one authority, namely, the local Medical Officer of Health.

3. The Ontario Medical Association is greatly interested in obtaining pure and standardized drugs and medicines for the people of this Province, and we hope that the Provincial Board of Health will help us in our efforts to this end.

4. The subject of improving the educational opportunities of the medical profession, is one of the utmost importance to the health of the community. It is very difficult, and in many instances impossible, for practitioners to visit the teaching centres in the large cities. To overcome this difficulty, the Ontario Medical Association is endeavouring to carry into effect a plan whereby medical teachers shall visit the various districts of the Province, and address, and give demonstrations to, the medical practitioners of these localities.

The younger man and the experienced teacher who will really endeavour to educate his hearers, is not well off. For this reason he cannot afford to travel and pay his way. He is qualified to teach new things which the general practitioner should know and use. We strongly feel that for the health of the Province he is, in the most cases, the man who should go; hence his travelling expenses must be paid and he should receive a nominal fee so that his hearers may not feel that they are under any obligation to him personally. Our practitioners need this instruction greatly. We believe that our Association should have a fund by which the more isolated physicians could be aided in obtaining teachers of this class.

With this object in view, the Association through its Committee on Education, has arranged a Post-Graduate Schedule of subjects from which the local Societies may choose, and in order to partially remunerate the visitor for his loss of time, and very often loss of practice, desires to establish a fund, and it is towards this fund that we are asking the government to contribute the sum of ten thousand dollars. We feel sure that the improvement of the health of the community, which would result, would amply repay the State for this outlay.

All of which is respectfully submitted on behalf of the Ontario Medical Association.

J. H. Mullin, *President.* T. C. Routley, *Secretary.*

Toronto, February 17th, 1921.

Both Premier Drury and the Hon. Walter Rollo, Minister of Labour and Health, evinced keen interest in the several points of the memorandum. Members of the deputation upon interrogation had ample opportunity to enlarge upon our requests. The Premier appeared to be particularly struck with the advisability of the establishment of a bureau for the standardization of drugs, and thought our plan for post-graduate education worthy of support.

The deputation was assured that our representations would receive the careful and sympathetic consideration of the Government.

Medical Legislation

To The Honourable Premier of the Province of
Ontario
And Members of the Cabinet.

Mr. Drury and Gentlemen:

As the subject of medical education and what qualifications should admit to the practice of medicine in the Province of Ontario are questions of so much importance to the people of this Province, it has been felt by the Ontario Medical Association, voicing as it does the views of the members of said Association, that the Ontario Government of Ontario would not be averse to learn these views:—

In the first place the Ontario Medical Association stands for high ideals in those who practice medicine, and demands of its members that they must be qualified to practise in this Province by passing the examinations of the College of Physicians and Surgeons, or by holding such qualification as is accepted by the said college as equal to its own diploma. The Ontario Medical Association also exacts from its members their adherence to a high standard of professional ethics. Further, its members must not ally themselves with any cult nor adopt any exclusive name indicating such.

But, apart from the foregoing, the Ontario Medical Association does not pretend to dictate to anyone who obtains the license of the College of Physicians and Surgeons that he should not adopt some particular name for his method of treatment. The adoption of such special names as are not recognized by the regular medical profession, as represented by the Ontario Medical Association, only has the effect of debarring such persons from membership in the Association. This, however, has no effect on their right to practise, providing they secure the license of the College of Physicians and Surgeons of Ontario.

The Ontario Medical Association is a voluntary organization, and has among its objects the following:

1. To promote a high standard of Medical Education in the Medical Colleges of the Province, and to aid the College of Physicians and Surgeons in maintaining such a standard.

2. To develop and maintain a high code of professional conduct, with the object that the people may ever feel proud of the medical practitioners of the Province and look up to them as being both well informed and truly trustworthy citizens.

3. To use its influence to avert the disaster that would result to the people of this great Province were the standards of Medical Education lowered on any subject or on the whole below that prevailing at the present day.

4. To do what it can to foster a high type of Medical Journalism in the Province, in order that the most recent and aproved views on all medical subjects may be laid before the members of the profession with the least delay.

5. To aid in securing the assistance of specially well informed members of the medical profession in all departments to give lectures and demonstrations throughout the Province to the members of the Association belonging to its many local branches.

The Ontario Medical Association would most respectfully invite the attention to the Government and Legislature of Ontario to the definition of the Practice of Medicine as laid down by Mr. Justice Frank E. Hodgins to be found on page 66 of his able report on Medical Education in Ontario.

"The term 'Practice of Medicine' shall mean and include:

"(1) The use of any science, plan, method, system or treatment with or without the use of drugs or appliances for diagnosing, alleviating, treating, curing, prescribing or operating for any human disorder, illness, disease, ailment, pain, wound, infirmity, injury, defect or deformity or physical or mental condition, and the holding out, offering or undertaking by any means or method to do any of the foregoing and including midwifery and the administration of anæsthetics.

"(3) Any manipulation or other kind of physical or mental treatment whatsoever, suggested, prescribed or advised, for body or mind, administered to, operated upon, or intended to be followed by the patient himself or herself, intended or professing immediately or ultimately to benefit the patient, and the holding out, offering or undertaking by any means or method to use the same or to diagnose.

"Any person who shall habitually use in advertising any title such as M.D., M.B., D.C., D.O.S., or any title as indicated thereby or as surgeon, doctor, physician, healer, professor, specialist, or any other letters, sign or appellation having the same or similar import in relation to medicine as defined above, shall be considered prima facie as practising medicine. Those possessing the degree of doctor of dental surgery, or being licentiates of dental surgery, shall not be within the above provisions."

At its Annual Meeting held in June, 1919, the Ontario Medical Association carefully considered and unanimously adopted the report of the Legislative Committee which contained the following statement regarding the foregoing definition:

"The Ontario Medical Association approves of the foregoing definition of the 'Practice of Medicine', but would respectfully beg leave to suggest that the word 'habitually' be omitted from the last paragraph, as it would leave an opening for those who travel from place to place as itinerant practitioners. They might sometimes use one title and sometimes another, as they changed their location at short periods of time. These persons do much harm and are often difficult to deal with at law."

The Ontario Medical Association would direct attention to the words of Mr. Justice Hodgins to be found on page 66 of his report on Medical Education in Ontario, and which reads as follows:

"All parties that have appeared before me have expressed a desire that the word 'Medicine' or 'Practice of Medicine' should be defined by Statute.

"The latter can and should be dealt with, but its scope evidently will depend upon how far the recommendations of this report are adopted."

If they are adopted, then the definition of the "Practice of Medicine" may be couched in the words given and subject to such modifications as will exclude from it the exercise of the tenets of any religion or any practice not properly within it, such as massage under the direction of a regularly qualified physician, or the fitting of glasses by mechanical means or aid given in any emergency.

These words of Mr. Justice Hodgins are very appropriate, and should receive the most careful consideration at the hands of the Government and Legislative Assembly of Ontario.

On the matter of the right to practice, the Ontario Medical Association prior to June, 1919, adopted the following, page 3 of "Report of the Ontario Medical Association on Judge Hodgins' report on Medical Education", a copy of which was filed with the Government:

"The chief end of all legislation is the protection of the people. In all matters pertaining to the treatment of all forms of disease, and injuries this can only be secured by exacting from all who would undertake the duties of attending and treating the sick or injured the highest possible standard of training and scientific education that modern medical scientific knowledge can furnish. Such legislation will not only protect the public, but it will, in a very large measure, protect the profession against slothful methods in its ranks and overcrowding, and the evils that tend to flow from these. No one should, therefore, be permitted to practice any form of healing who does not obtain the Ontario license."

This position had been already emphasized by Mr. Justice Hodgins in the following conclusions to be found on page 72 of his report:

"(6) That Osteopaths, Chiropractors and other drugless physicians practising in this Province on the 30th day of June, 1913, be permitted to continue for six months from the 1st day of January, 1918, without being subject to any disability or prosecution.

"(7) That after the 1st day of July, 1918, no one shall practise medicine as defined aforesaid in this Province without a license from the College of Physicians and Surgeons of Ontario, except that those who were practising what is known as Osteopathy on the 30th of June, 1913, if possessed of a diploma from one of the five colleges now recognized by the American Osteopathic Association, with five years' practice in Osteopathy, or if they obtain from that Association a certificate that they are qualified to pass the examination for license in the State where Osteopaths are examined and licensed which has the highest standard, may continue to practise under a special license to be issued by the Minister of Education in which the practice of the holder shall be limited to osteopathy and as not including the administration of drugs nor the performance of surgery with instruments."

The views set forth in these two conclusions cannot be too strongly emphasized. The first and supreme duty of the state is that of protecting the life and health of every citizen. On this aspect of the case hear what Mr. Justice Hodgins has to say as found on page 133 of his report:

"It ought to be clear that individuals making up the public are not themselves competent to form a proper conception of the value of the reverse of the services of those holding themselves as our physicians. There are few positions in life in which a man is so completely and often so suddenly placed in the hands of someone else as is the sick man in the presence of the physician. He cannot bargain on equal terms, and his family are equally helpless, both because of their ignorance of medical science and because, under usual circumstances, they are anxious and worried. Hence it has always been one of the highest duties of the State to see that those who are called in to prescribe for human ailments are so trained that they can be safely trusted to properly ascertain the cause and prescribe for its remedy. And not only so, but the prevention of disease in the Community is such a pressing and vital need that the State is not content with providing proper training for the physician, but it compels the citizens of the State to submit not only to rules and regulations, but also to drastic measures, cures and operations for the benefit of the Community prescribed by those who have adequate training and experience in such matters, and this presupposes the State has satisfied itself that proper standards of learning have been set up and maintained for those who are thus authorized to heal and direct."

From the force of those weighty words there can be no escape. A man is taken suddenly ill with pain in his side and calls in an osteopath, who may institute some process of manipulation. The case, however, is one of pneumonia for which such treatment would be most injurious. Or, take another case. A person is seized with a severe pain in the abdomen and sends for a chiropractor, who may proceed to treat some displacement of the spinal column. The case is one of acute appendicitis. Time is lost and there is grave risk that a life may also be lost under such a method of treatment, carried out on such an erroneous diagnosis. Or, again, take a case of Diphtheria, Scarlet Fever, or Smallpox, where it is so important that a correct diagnosis in the interest of other people be made at once. Here the value of diagnosis is supreme. But to put this matter beyond all doubt, turn to page 34 of Mr. Justice Hodgins' report, and read what he says on the question of diagnosis:

"Ability to make a correct diagnosis is therefore the primary end of all good medical education. Diagnosis does not necessarily end when a decision has been reached as to the particular disease to be combatted, for it continues during the treatment to operate with regard to each successive phase of the case. It is as vital in realizing the effect of the treatment, in detecting each manifestation of what are called complications, and in recognizing progressive improvement or the reverse, calling for a continuance or a modification of the particular treatment. In this aspect it becomes part of and is partially merged in the method of healing employed."

To be able to make a correct diagnosis one must have received a thorough training in anatomy, physiology, pathology and bacteriology; and this must be followed up by long and intensive training at the bedside of the sick. On this point, note the words of Dr. L. F. Barker, Professor of Medicine in Johns Hopkins Medical Faculty, Baltimore. Here they are:

"Even the representatives of the Medical sects admit that the work of the first two years of the Medical School in the pre-clinical sciences should be the same for all Medical students. But why should there be any departure from the scientific method when the work of the clinical subjects of diagnosis and therapy are approached at the middle of the medical student's course? There is only one great science of medicine, just as there is one science of chemistry, one science of physics, and one science of biology. We hear nothing of sects in physics or of sects in chemistry. Nor should we, in my opinion, hear anything any longer of sects in medicine." (See page 35, Justice Hodgins' Report.)

These weighty opinions of Justice Hodgins and Professor Barker, opinions that could be multiplied many times over, should finally set at rest the claims of Osteopaths, Chiropractors, and all such sects to legislative recognition. On the subject of creating further divisions among those entitled to treat people, Justice Hodgins, on pages 34 and 35, remarks thus:

The progress of Medical Science and investigation is continuous, and a survey of the changes in medical opinion and methods in the last half century, having regard to the introduction of anæsthetics, antiseptics and serums, the extent of bacterioriological research and chemical analysis, and the importance of diet, exercise and cleanliness, is most striking and impressive. These necessarily enlarge the scope of medical education into regions not originally traversed by it, and render it imperative that it should be most comprehensive and exacting if it is to include these modern imperative and enlightening studies. I have not been able to find any escape from the impression, which these results force upon one's mind in weighing the advantages of the present system against what is now proposed."

On page 31 of his report Justice Hodgins recommends that the Osteopaths now engaged in practice procure from the American Osteopathic Association a certificate of their fitness to practice, and suggests how this may be done. Regarding this certificate he remarks thus:

"The license thus granted shall not permit its holder to use or administer drugs, nor to perform surgery with the use of instruments, nor to sign death certificates, nor to use the term 'Doctor' either in full or otherwise indicated, and must be limited to Osteopathic methods and practice."

Here one sees how careful he is to safeguard the people and to avoid creating medical divisions.

The Ontario Medical Association feels impelled to urge that Chiropractic should be given no consideration in law. It is founded on a complete negation of all medical science and progress. If it is anything at all, it only is a system of gross and pitiable ignorance. With regard to Osteopathy this must be set forth clearly that it is not a system of medicine at all, but merely a phase of general therapeutics or treatment which in turn is only one department of the many that make up a full course of medical studies. What there is in it that has any merit is a part of the curriculum for education of the medical profession which is continually making use of massage, rubbing, and manipulation in the treatment of ailments suitable for such treatment, as amply demonstrated in the recent war. Osteopathy should not be created into a system of treatment and set loose upon the public to be used by persons incapable of making correct diagnosis of human ills and injuries, and consequently applied by these practitioners many times, possibly to the previous detriment of those so treated, or rather mistreated, as would result, for example, from forcible manipulation of a tuberculous joint, or one that had been of such nature, but still remained stiff.

"Upon the best consideration I can give to this important subject, I can see no escape from the conclusion that treating Osteopaths as a separate class in regard to their medical training would be, especially at this juncture a very great mistake". (Quoted from Hodgins' Report.)

When one turns to Chiropractic the statement made by Justice Hodgins on page 33 of his report should settle the matter:

"I cannot bring myself to the point of accepting, as part of our legalized medical provision for the sick, a system which denies the need of diagnosis, refers 95 per cent. of disease to one and the same cause, and turns its back resolutely upon all modern medical scientific methods as being founded on nothing and unworthy even to be discussed."

The Association would direct attention to the fact that we do not in any manner interfere with the religious views of our members, nor do we permit discussions on religious topics. It is only when a religious body enters upon the continuous treatment of disease that it challenges an examination of its methods at the hands of the regular medical profession. It is for this reason that Christian Science comes under observation. A careful study of "Science and Health" with Key to the Scriptures, the text book of this denomination, and other writings of the cult, reveals a deplorable condition of ignorance about disease, injuries, matter and therapeutics. The teachings on these subjects set forth in "Science and Health" are a positive menace to the public. This became very clear to the mind of Mr. Justice Hodgins, who, on page 38 of his report, expresses himself thus:

"But their rights should be carefully restricted to the bona fide exercise of the tenets of their religion, and they should possess no other or different right or immunity from what is enjoyed by the clergyman or minister who is called in for the spiritual benefit of the member of his communion, and whose ministrations often react beneficially on physical suffering."

To make the position of the Christian Scientist perfectly clear let two quotations from the 1917 Edition of the "Science and Health" suffice:

On page 179 these words are found:

"Treatises on anatomy, physiology and health, sustained by what is termed material law, are the promoters of sickness and disease. It should not be proverbial, that so long as you read medical works you will be sick."

Then again on page 417 the following appears:

"To the Christian Science healer, sickness is a dream from which the patient needs to be awakened."

To allow Osteopaths and Chiropractors to secure the right to practice by the study of a limited part of the medical course would establish a very dangerous precedent. Others might come forward and claim a similar right by taking up electricity, or baths, or drugs only, without making themselves acquainted with other branches of medical science. Thus we might soon have Balneopathists, Electrotherapeutists, etc.

One would think that if the Osteopaths and Chiropractors were sincere in a desire to treat their patients properly they would not be unwilling to acquire such a complete knowledge of all departments of medical learning as would enable them to act judiciously in all cases. If they are not willing to accept this view, one can only conclude that they are seeking a short cut into the practice of medicine, and thereby hope to secure its rights and privileges without the expenditure of time and labour required to obtain the license, of the College of Physicians and Surgeons of Ontario.

After a long and strenuous struggle for at least seventy-five years, the medical profession in Ontario has attained its present proud position of holding one of the first places in the world. The Medical Colleges of Ontario are now recognized to be as efficient as those found anywhere, and our hospitals are a credit to the generosity and intelligence of the people. An immense amount of time, thought and money have been expended to secure these desirable conditions. It would be a disaster to the citizens of the Province were the bars to be lowered now, and the gates opened so that persons holding mediocre qualifications would be permitted to practice medicine or any branch of healing. The plea for a high standard is made by a united medical profession in behalf of the people, and not in its own behalf. Let there be one standard for all.

The Ontario Medical Association wishes only to be regarded as trying to safeguard the health of the people of this great province. This has ever been its attitude. Its contention is that all who would seek to heal the sick or treat the injured must first give evidence of being in the possession of the requisite skill to do so. This can best be secured by insisting upon all who practice medicine holding the qualification of the Ontario College of Physicians and Surgeons. It is the earnest desire of the Ontario Medical Association that the Government and Legislature of Ontario may see their way to validate this position; namely, the one portal to the practice of medicine in any of its branches.

We respectfully appeal to you, therefore, to give this matter your early consideration since the passage of time merely makes the problem increasingly difficult.

All of which is respectfully submitted on behalf of the Ontario Medical Association.

J. H. Mullin, *President.* T. C. Routley, *Secretary.*

The Retirement of Major-General G. L. Foster as Director of Medical Services, Ottawa

Major-General Foster, M.D., F.R.C.S., LL.D., C.B., after a long and brilliant career in the Military Medical Service, has retired to civil life. He was born in North Kingston, Nova Scotia, in 1874, and after a preliminary education in Nova Scotia, he graduated in medicine from the University of New York, in 1896, and immediately became a partner of Sir Frederick Borden in a country practice in King's County. He joined the Militia as Surgeon-Lieutenant in the King's County Regiment, in 1897, and reported for duty as Surgeon at the Royal Military College in the same year. For the next four years he was engaged with the Yukon Field Force, returning from the far North-West in 1901. From this time on, as a member of the permanent military force, he served in various places in Canada, England and Ireland, and returned in 1909 to Halifax, as A.D.M.S. of M.D. No. 6. In August, 1914, we find him at once at Valcartier with the Canadian troops for duty overseas, with whom he goes as A.D.M.S. of the Canadian Division. It was in France during the early part of the War that he merited the high promotion which he subsequently assumed in London. He took part in the battles of Neuve Chappelle, Festubert, Givenchy and the second battle of Ypres, during which last battle, the Canadian Medical Services handled the casualties continuously for fourteen days and nights. For this special service he was mentioned in despatches and was subsequently awarded the C.B. In September, 1915, he was appointed D.D.M.S. of the Canadian Corps, and in the following year he was again mentioned in despatches for his work in the Ypres salient and on the Somme. With such a career behind him, it was only natural that when the vacancy occurred, he was promoted to Major-General and appointed D.G.M.S. of the Overseas Forces of Canada with Headquarters in London (February, 1917). Few medical officers have received more honours than has General Foster, for in addition to those mentioned above, he was made an Officer of the Legion of Honour, Knight of Grace of St. John of Jerusalem, F.R.C.S., Edinburgh, and LL.D., McGill.

General Foster carries with him the good wishes of his colleagues in the Canadian Corps, and we hope that in his return to civil life his services to Canada may not be wholly lost.

The Coming Annual Meeting at Niagara Falls, May 31st, June 1st, 2nd and 3rd.

No physician in Ontario should miss this forty-first annual meeting, which promises to be one of the best ever held in the province. Not only will it give an opportunity to hear the leading men throughout America on special subjects, as well as bring physicians together by class and college re-unions, but it will be the best of reasons for a much-needed holiday for the hard working man and his wife.

Canada offers no better place than Niagara Falls for scenic attractions. Beautiful drives, "The Falls," the Gorge Route, the Rapids, the Whirlpool, the immense construction works of the Hydro Electric, the various Power Plants, Queenston Heights and Brock's Monument, the Lewiston Golf Club, are but a few of the many attractions. A golf match is being arranged for an afternoon at the Lewiston Golf Club. Members wishing to play must bring their own golf clubs. An idea of the programme to be placed before the profession is as follows:

General Sessions

These will be held at 11.30 Wednesday, Thursday and Friday mornings, thus leaving free both morning and afternoon for meetings of sections.

The address in Medicine will be given by Frank Billings, of Chicago.

The address in Surgery by E. Starr Judd, of Rochester.

There will be a general address on Hospital Problems by Malcolm T. MacEachren, Vancouver, and an address on Federal Department of Health by Dr. Amyot, of Ottawa.

The Committee is arranging for eminent speakers who will give after-dinner addresses on Wednesday and Thursday evenings.

Section in Medicine

"The essentials of our present day knowledge of the Diagnosis of Pulmonary Tuberculosis."

Address on Tuberculosis. Dr. J. C. Pritchard, Battle Creek, Mich.

Symposium on Diabetes. This subject will be presented by Drs. Jno. Williams, of Rochester; Prof. McLeod, Toronto University; Walter Campbell, of Toronto; and W. T. Connell, of Queen's.

Symposium on Pneumonia. Arthur A. Small, Chicago; Campbell Howard, Iowa; Prof. Miller, of Queen's; and Prof. Duncan Graham, Toronto.

Food Stuffs. Prof. Crane, of London.

General Survey of Nephritis. Leonard G. Roundtree, of the Mayo Clinic.

Section in Surgery

E. Starr Judd promises a most interesting paper on "The Surgery of the Gall Bladder".

Dr. Buntz, of Cleveland, on "Tumours of the Breast".

Dr. Rehfus, of Jefferson Medical College, Philadelphia, a paper on "Gastric and Duodenal Ulcer".

Section in Obstetrics and Gynæcology

This section promises to be very interesting. Among those who have promised papers are Dr. Cullen, of Detroit, and Dr. Potter, of Buffalo.

Child Welfare will be dealt with Wednesday afternoon.

The Conjoint Session with Surgery will deal with Cancer of the Uterus.

Eye, Ear, Nose and Throat Section

Interesting papers are promised for this section.

X-ray Section

The programme that is being arranged promises to be exceedingly interesting. Among the papers promised is one on "Superficial Therapy", by Dr. Jno. Reemer, of New York. "Deep Therapy and its Modern Development", by Dr. Pariseau, of Montreal, and Dr. Richards, Toronto.

Papers on the "Diagnostic Side" will also be presented.

On Friday an open meeting will be held, at which any member may present plates or films.

Many Canadians have promised papers.

Most of the men giving us papers "from across the line" are graduates of Canadian Universities.

Re Discussion. If preferred, questions in writing may be sent to the Chairmen of Sections instead of being presented verbally.

The complete programme will appear in the May Journal. Informal Dress on all occasions.

Hotel Accommodation. The Clifton Hotel, which is being entirely reserved for the meetings of the Association, can take care of 400 guests.

Reservations should be made early.

Additional accommodation can be provided for 900 more on the Canadian and American sides.

Entertainment is being arranged for the Ladies in the way of Drives, Concerts, Garden Parties, etc.

The Executive Committee of the Ontario Medical Association asks and expects the co-operation of every practitioner in Ontario. Never was there a time in the history of the profession when the necessity of unity and co-operation was so vital as at the present moment.

Your suggestions, opinions, questions, in fact anything which you may wish to direct to the Committees in charge will be cheerfully dealt with by the following officers:

Committee on Programme:

Dr. J. Heurner Mullin, Chairman, Hamilton.

Dr. T. C. Routley, Secretary, 127 Oakwood Avenue, Toronto.

Dr. James L. Mahoney, Local Secretary, 265 Victoria Avenue, Niagara Falls.

Committee on Entertainment:

Dr. E. T. Kellam, Chairman, 73 Queen Street, Niagara Falls.

Committee on Arrangements:

Dr. F. W. E. Wilson, Chairman, 25 St. Clair Avenue, Niagara Falls.

Committee on Publicity:

Dr. S. N. Davis, Chairman, 58 St. Helens Avenue, Welland.

Section of Medicine:

Dr. J. R. Mencke, Chairman, Bridgeburg.

Dr. W. J. Weaver, Secretary, 89 Main Street, Niagara Falls.

Section of Surgery:

Dr. W. J. Macdonald, Chairman, 14 King Street, St. Catharines.

Dr. J. G. Harkness, Secretary, 13 King Street, St. Catharines.

Section of Obstetrics and Gynæcology:

Dr. H. D. Cowper, Chairman, 173 Main Street West, Welland.

Dr. J. R. Boyd, Secretary, 169 Main Street East, Welland.

Section of Eye, Ear, Nose and Throat:

Dr. J. G. Sutherland, Chairman, 35 Church Street, St. Catharines.

Dr. F. C. Macdonald, Secretary, 37 Church Street, St. Catharines.

Section of Radiology:

Dr. L. R. Hess, Chairman, Main Street, Hamilton.

Dr. H. M. Tovell, Secretary, 206 Bloor Street West, Toronto

NOVA SCOTIA

Dr. Arabella MacKenzie has recently been appointed to the staff of the Massachusetts-Halifax Health Commission to direct the work of the pre-school age dental clinic at the Admiralty House Health Centre. This is said to be the first dental clinic in the world that will limit its work to the pre-school age period. The dental clinic will co-ordinate the dental work with the various medical clinics, Child Hygiene, Nutrition and Posture. Nutrition of the teeth as well as dental prophylaxis will be featured as essential to oral health.

Dr. F. W. Tidmarsh, after having taken a special course in conducting Nutrition Clinics in Boston, has been appointed to the same staff for the purpose of organizing Nutrition Clinics in the Commission's Health Centres in Halifax and Dartmouth. Nutrition Clinics will be organized for undernourished pre-school age children and school age groups.

Dr. W. Alan Curry has accepted an appointment to organize Posture Clinics for the Massachusetts-Halifax Health Commission. To this service children will be admitted, after such handicaps as adenoids and tonsils have been removed, and the teeth having been placed in the best of condition it is possible to put them in.

These three services will be watched with the greatest of interest by the medical and nursing profession and by all public health workers.

Medical Societies

Re-Organization of the British Columbia Medical Association

At a meeting held January 15th last, the re-organization of the British Columbia Medical Association was successfully effected.

In response to the call sent out for this meeting by Dr. H. W. Riggs, Vancouver, Secretary *pro tem*, over one hundred medical men from outside of Vancouver signified their desire to become members of the Association.

Certain Standing Committees were appointed and, in this connection, particular emphasis was laid on the importance of the work of the Committee on Publicity and Education. It was pointed out that the work of this Committee was along new lines and that upon it would devolve a considerable portion of the future work of the Association.

In order to bring the entire profession into the Association as soon as possible, district organizers were appointed to cover the Province. Already there has been a very satisfactory response from all sections.

The matter of affiliation with the Canadian Medical Association was taken up and a resolution favourable to this was passed.

The following is a list of the Officers and Committees for the ensuing year:

Officers: President, Dr. A. S. Monro, Vancouver; Vice-President, Dr. W. J. Knox, Kelowna; Secretary-Treasurer, Dr. W. A. Clarke, Vancouver.

Executive Members: Dr. Rothwell, New Westminster; Dr. Hudson, Victoria; Dr. Seldon, Vancouver.

Standing Committees: Legislative: Dr. P. A. McLennan, Vancouver; Dr. W. T. Barrett, Victoria; Dr. M. J. Keyes, Victoria; Dr. Frederick Brodie, Vancouver; Dr. J. G. McKay, New Westminster.

Workmen's Compensation Act: Dr. R. E. Walker, New Westminster; Dr. J. H. McDermott, Vancouver; Dr. Geo. Hall, Victoria; Dr. W. F. Drysdale, Nanaimo; Dr. C. Eggert, Prince Rupert.

Educational and Publicity: Dr. W. B. Burnett, Vancouver; Dr. F. J. Buller, Vancouver; Dr. O. S. Large, Vancouver; Dr. W. E. Scott-Moncrieff, Victoria; Dr. E. H. McEwan, New Westminster.

District Organizers: Vancouver, Dr. F. P. Patterson; Victoria, Dr. Raynor; Island N., Dr. Geo. McNaughton; Prince Rupert, Dr. W. T. Kergin; Revelstoke, Dr. Sutherland; Kamloops, Dr. J. S. Burris; Okanagan, Dr. W. J. Knox; Kootenay, Dr. Williams (Rossland); Crow's Nest Pass, Dr. Green; Fraser Valley, Dr. J. F. McKay; G.T.P. District, Dr. Wrinch.

The work the Association has mapped out for itself may be briefly outlined as indicated in the following excerpts from the new Constitution:

Article 2. Objects: The object for which this Association is established is the promotion of medical and the allied sciences, and the maintenance of the honour and the interests of the medical profession.

Article 7. Committees: The Standing Committees shall be: (*a*) Legislative Committee, whose duty it shall be to watch all Bills affecting the profession coming before the Legislative Assembly and municipal councils, and to take such steps as are necessary to promote legislation favourable to and to combat legislation adverse to the interests of the profession and the public. (*b*) A Workmen's Compensation Act Committee, whose duty it shall be to deal with all matters affecting the profession ensuing out of the Workmen's Compensation Act. (*c*) Publicity and Educational Act Committee, who shall arrange to conduct a systematic and continuous campaign through the lay press to educate the public with regard to questions of health, sanitation, recognition of early signs of diseased conditions, the progress of medical science, the lack of scientific training of members of various cults which pretend to heal by irregular means, and any other subjects which from time to time they may deem in the interests of the public and the medical profession, should be given authority. For this purpose, they shall have authority to select a staff of control both lay and medical to prepare articles along the lines indicated. They should appoint a Board of Censors (medical) who shall review all such articles before they are submitted to the press, so as to eliminate any statements which may not be orthodox or be recognized as sound in the light of present-day medical knowledge.

Much credit is due to Dr. H. W. Riggs, Vancouver, for the work he did in getting the meeting called and the organization again successfully launched on what it is confidently hoped will be a career of usefulness to both the public and profession.

Canadian Society of Anæsthetists Meeting at Niagara Falls, June 1st to 3rd, 1921

The Canadian Society of Anæsthetists has been accorded the distinction and honour of a Joint Meeting with the Ontario Medical Association and the Interstate Association of Anæsthetists. This, the First Annual Meeting, will be held in Niagara Falls, June 1st to 3rd, at the Clifton House. The New York Society of Anæsthetists is also invited to participate.

An interesting and instructive programme is under preparation. There will be a Joint Session of all the Organizations on the afternoon of Friday, June 3rd, during which papers on anæsthesia, of pertinent interest to those in attendance, will be presented. One feature of the meeting will be a Case Report Session.

All anæsthetists, surgeons, specialists, dentists and research-workers, interested in the advancement of the science and practice of anæsthesia, are cordially invited to attend the Niagara Falls meeting and find out how their needs for progress are being met.

Information has just been received that the Anæsthetic Section of the Royal Society of Medicine are sending Dr. H. E. G. Boyle, O.B.E., Anæsthetist and Lecturer on Anæsthetics to St. Bartholomew's Hospital, as their representative.

The following Nominations have already been made for 1921–1922:

President, William Webster, M.D., Winnipeg, Man.; vice-president, David H. Arnott, M.D., London, Ont.; Secretary-Treasurer, Wesley Bourne, M.D., Montreal; Executive Committee: Thomas R. Hanley, B.A., M.D., Toronto, Ont.; Charles LaRocque, B.A., M.D., Montreal; F. H. McMechan, M.A., M.D., Avon Lake, Ohio; Walter L. Muir, M.D., Halifax, N.S.; Members are requested to submit further nominations, and their attention is hereby called to By-Law No. 6.

Those interested are invited to communicate with the Secretary, Dr. Wesley Bourne, 34 St. Mark Street, Montreal.

Book Reviews

Diseases of the Skin. A Text Book for Students and Practitioners. By J. M. H. MacLeod, M.A., M.D., F.R.C.P. With 23 coloured and 435 other illustrations. Pages xx and 1307. Publishers: H. K. Lewis & Co., London. Price, £3 10.

No work on dermatology published in recent years has been better received than this one. Dr. MacLeod has surpassed the most sanguine expectations of his medical friends.

The classification of the diseases is based on the cause, which is the most rational and readily understood one.

Combined with the symptomatology and treatment of each disease is a thorough description of the pathology.

The volume is illustrated by numerous photographs and micro-photographs. This book can be recommended not only to students but to all practitioners. D. K. S.

A Text-Book of the Practice of Medicine. By James M. Anders, M.D., Ph.D., LL.D., Professor of Medicine Graduate School of Medicine, University of Pennsylvania, Fourteenth Edition, thoroughly revised with the assistance of John H. Musser, Jr., M.D., Associate in Medicine, University of Pennsylvania. Octavo of 1284 pages, fully illustrated. Philadelphia and London: W. B. Saunders Company, 1920. Cloth, $11.00, net.

That this text-book should require a fourteenth edition with numerous reprintings in the space of twenty-three years since the first edition appeared, is ample demonstration of its popularity as a text-book of medicine for the student and general practitioner.

The present edition is a revision of that of 1917, when the book was entirely reset. The influence of the development of medical knowledge during the war is well illustrated in the revision of the descriptions of typhus fever, yellow fever, pneumonia, cerebrospinal meningitis, scurvy, focal infection, measles and others. The newer work on hay fever and asthma is included. The article on influenza has been entirely re-written, while a number of new headings appear, trench nephritis, disordered action of the heart, epidemic encephalitis and a number of others.

The authors may be assured of a continued popularity for their text-book while they continue to keep it up with the march of medical progress.

J. H. E.

Syphilis. By Lloyd Thompson, Ph.B., M.D., physician to the syphilis clinic Government Free Bath House. Second edition, thoroughly revised, 486 pages. Price, $7.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

This book is an excellent resumé of the entire subject of Syphilis. It is concise, scientific, well illustrated and is particularly excellent in its typographical character.

The book is in harmony with the newer findings in the microbiology and pathology of the disease. The author discredits Ricord's long standing differentiation of the disease into stages, and points out that such classification is no longer justified, in view of our greater knowledge of the pathology of the disease.

The author departs from the common practice of making spirochæta feminine, and while he is not entirely consistent, for the most part describes the organism as spirochæta pallidum. According to the common usage, spirochæta pallida is the better form. If any change is to be made, the organism should be called treponema pallidum, which is more in accordance with recent biological classification.

The book is particularly valuable for its chapters on laboratory methods of diagnosis, including the complement-fixation and colloidal gold tests. It is replete with authoritative references to both the classical and the latest literature, which are given with extreme exactitude.

The book is to be highly recommended as a text book on the diagnosis and treatment of this important malady.

F. S. P.

WANTED—Eye, Ear, Nose and Throat Specialist desires location in small Canadian city. Address, Canadian Medical Association Journal.

WANTED—Applications for position of Paediatrician to the Montreal General Hospital will be received by the Secretary of the Medical Board, Dr. E. M. Eberts, address, Montreal General Hospital. Applications may be sent in up to May 1st, 1921.

WANTED—at once, an unmarried physician on the medical staff of the Nova Scotia Sanatorium, Kentville, N.S. Apply for full particulars to

Medical Superintendent.

Reading Notice

IN CHINA, TOO—

Distance is no barrier to the appreciation of quality, as will be noted from the accompanying illustration, which shows a sign that is well known all over America, on the office door of a physician in far-off China

In this country, the familiar Mulford Keystone has been synonymous with quality for a number of years, and a great many physicians and pharmacists in foreign lands have been quick to appreciate the value and prestige which accompany the display of this sign.

In any clime, regardless of the language or manners and customs of the people, superior quality soon asserts itself and rises to its proper level at the top of the competitive heap.

In the last analysis, quality should always be given first consideration, rather than price, and the H. K. Mulford Company deserve to be congratulated upon their long, persistent and successful stand upon this basis.

Medical Societies

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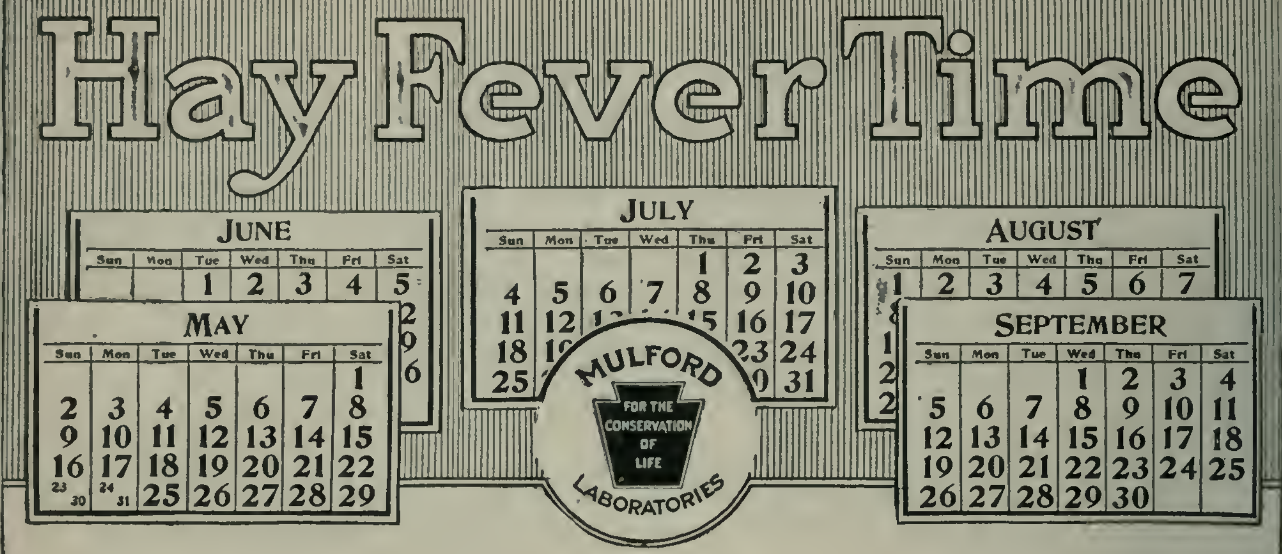

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THE PIONEER BIOLOGICAL LABORATORIES

The Canadian
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THE FINANCING OF PUBLIC HOSPITALS

M. T. MacEachern, M.D.

General Superintendent, Vancouver General Hospital

BOARDS of trustees and hospital administrators are to-day facing serious problems in connection with financing public hospitals. More money is required than formerly to meet current expenses. This is due to many reasons, but to two particularly. First, it is a well-known fact that expenses of all kinds have increased enormously far out of proportion to any increase in revenue that has been secured. This increase in expenses has taken place during the past few years, and although we are now on a falling market, little hope can be entertained of prices ever coming to a pre war state; the cost of operating hospitals, therefore, will remain higher than in the pre-war years. The second reason, and possibly the more important, is the fact that our people are demanding an increased service from these institutions, and the expense of such a service is so great that the present consolidated revenue cannot meet it. This service is not unreasonable; it is only a minimum requirement, for we recognize to-day that hospitals must be efficient and do their part in assisting the doctor to get as good a result as possible.

Unless they are heavily endowed public hospitals secure their support mainly from four sources. These are: patients' fees, philanthropy, municipal assistance and provincial assistance. All are agreed that hospital charges or different services to the patient are now as high as they can be made without unduly burdening the patient From this source very little further relief can be secured; indeed in many cases to-day the high prices make some of the essential services for diagnosis almost prohibitive Philanthropy has been overworked during the war and since the declaration of peace the period of reconstruction has continued to make constant demands on it. It has been further burdened by heavy income taxes of a federal and provincial nature with the result that good old philanthropy, upon which many hospitals depended, has been forced to take a more retiring place in respect to its liberality. Municipal authorities tell us that their present consolidated revenue is exhausted and they cannot and will not give further assistance till a broadened scheme of taxation is brought in. They advise taking such matter up with the provincial government. The provincial government on being consulted present a similar answer and state that their consolidated revenue is now required in its entirety for the usual expenses of the administration of affairs in the province. What, then, about further assistance to our hospitals and health institutions? The only solution is that new revenue must be found which will provide immediate as well as permanent relief, and will put our institutions on a sound financial basis.

Granted that new revenue must be found the question arises: how is it to be obtained? I believe that people to-day are ready to accept a universal basis of taxation for hospital purposes; a tax the application of which would involve in an equitable way almost every resident in the province, thus conforming to a broadened taxation scheme in the truest sense of the word, and such a tax should be sufficient in amount to pay, either wholly or in part, the general ward service together with all that goes with it. This general ward service, to everyone paying the tax, would include board nursing, accommodation, free use of all diagnostic facilities and all specialized treatment departments in connection with a well-regulated hospital. It might be desirable to establish a rate of $1.00 per day for a public ward, but this is a matter of opinion. The per capita allowance for each patient through such a taxation would thus be sufficient to pay for all costs of the ward, giving the patient every possible facility that would be required for competent diagnosis and efficient treatment. If the patient was still obliged to pay $1.00 per day this, augmented by the per capita secured from the general taxation scheme, would certainly be a very decided improvement on the present pernicious practice of charging the patient from $2 50 to $3.00 a day. This heavy charge makes it impossible for a great number to meet their obligations in any manner whatsoever, thus depriving our hospitals of sufficient revenue and our patients of necessary services which they cannot obtain on account of financial conditions. However, whether the general ward service with all that goes with it should be free or should be charged for at $1.00 per day, is a matter of opinion; some might desire to pay some fee.

This scheme, as outlined, would in no way interfere with the right of patients to choose the doctor they would wish to attend them as well as to which hospital they would prefer to go. It has been estimated that in the Province of British Columbia that it will require a tax of about $6.00 per person between the ages of eighteen and sixty-five, to sufficiently provide a per capita allowance of at least $3.00 per patient per day. This would eliminate all uncollectable accounts and relieve the hospital of the unpleasant task now so troublesome, of collection of accounts. The great advantage, however, would be the fact that every man, woman and child, regardless of religion, colour, financial circumstances or otherwise, would have access to efficient hospital service when ill. The private ward patient would share in the advantage of such a scheme just as much as the public ward patient, for the former would have the per capita allowance credited on his private ward service, that is to say: if the per capita allowance was $3.00 per day and the private room is costing him $6.00 per day, he would have a credit coming to him of $3.00 per day, owing to the fact that he has paid his hospital tax.

The collection of such a tax could be accomplished through the present governmental machinery without any additional cost. Several ways suggest themselves, and I will mention one or two of the more important.

Firstly For all those who are paying income tax or earning $1500 or over, an additional amount could be added to their taxation roll for the specific amount indicated as 'hospital tax", just the same as we now see an additional amount for our automobile on the present income tax roll:

Secondly. All who are not included in this manner would pay through the poll tax machinery by an additional tax known as a "hospital tax"; indeed, in this connection it would be advisable to alter the term *poll* tax to *service* tax, and we believe it would be more popular. In addition, there is also the payroll and various other means which could be used without adding additional machinery and cost for the collection of this money.

In the Province of British Columbia a careful analysis of the public hospitals has been made in respect to their financial condition. The findings show clearly that these institutions are in a serious financial condition, nearly all having heavy deficits and those that have not, frankly admitting that they are only able to avoid a deficit at the sacrifice of their patients and staff, and could not honestly lay claim to having performed their obligations efficiently, owing to lack of money. Indeed, it has come to pass that many directors of these worthy institutions find their positions so intolerable, owing to financial conditions, that soon they will have to resign as boards and ask the Government or some other authority to take over the hospitals. This is a condition which is not desirable and the British Columbia Hospital Association has taken up the question seriously with a view to a solution which will be practical and permanent. The matter has also been before representative organizations such as the Association of the Boards of Trade of the Province, the Union of British Columbia Municipalities and others, all of whom have made strong representations to the Legislative authorities. In a summary report recently issued by the British Columbia Hospital Association the following three objectives were set forth to be taken up at once:

Firstly: That some action be taken immediately to pay all already accumulated deficits which are embarrassing hospitals so much at present.

Secondly. That something should be done to prevent the accumulating of current deficits until a more permanent scheme of hospital financing be brought in.

Thirdly. That at the very shortest period of time a permanent, definite and efficient scheme of hospital financing should be established.

A recent memorial was presented to the Government of British Columbia by the British Clumbia Hospital Association, which read as follows:

"Whereas the public hospitals of our Province have almost without exception come to the point where they are confronted with heavy deficits, or else are seriously handicapped in their work from lack of suitable buildings, equipment, or staff:

"And whereas this very grave condition has supervened in spite of every effort having been made to provide sufficient funds by all the usual methods:

"And whereas under these conditions it is obviously only a matter of a very short time before further credit will be refused the hospitals by banks and tradesmen:

"And whereas it is inconceivable that such a contingency should be permitted to occur:

"We, the British Columbia Hospital Association, respectfully turn to your Honourable Body with the following proposals as the only reasonable solution to our problems:

Firstly. That the Provincial Government be requested to disburse forthwith the deficits of the public hospitals of British Columbia until such time as a better and more permanent financial policy for financing said hospitals is adopted.

Secondly. That the present scale of per capita grants from the Provincial Government be doubled until such time as a measure is brought in providing for a more permanent and adequate system of financing hospitals.

Thirdly. That the Government be requested to bring in a measure at the earliest opportunity to provide by a universal basis of taxation for the adequate financing of all hospitals receiving aid under the "Hospital Act".

The substance of this memorial has been taken up by various organizations and efficient follow-up work has been accomplished. No definite announcement has been made as to what the future policy shall be However the scheme as outlined would undoubtedly meet the people's approval in every way and has the advantage of not disturbing present existing organization.

The Halifax Meeting.—July 5th—8th, 1921. An important communication has been received from the Chairman of the Local Committee of the Halifax meeting with reference to hotel accommodation. He urgently requests that it be secured at the earliest possible moment, by writing to Dr. H. K. MacDonald, 133 Spring Garden Road, Halifax. Applicants should specify choice of hotel and nature of room desired (see March number). They should also indicate as definitely as possible, time of arrival and extent of stay. Provided applications are made in time, the Committee promises to find room for all visitors.

PROGNOSIS OF PULMONARY TUBERCULOSIS

Fred H. Heise, M.D.

Trudeau, N.Y.

IN pulmonary tuberculosis the prognosis is, to say the least, uncertain. So many factors which may or may not be under our control directly or indirectly influence the disease that in any given case the course, duration or outcome must remain largely an uncertainty. As a rule it is most unwise to give a definite prognosis unless based upon at least one month's accurate observation of the clinical progress of the disease. And as quite a few of our deductions will later be shown to be erroneous, dogmatism in prognosis should not be practiced. Nevertheless, there are conditions and circumstances which in a general way influence the prognosis of pulmonary tuberculosis favorably or unfavorably and a few of these will be briefly discussed.

It is quite generally accepted that an implantation of tubercle bacilli upon virgin soil will produce an acute tuberculosis, if any at all. For this reason clinical tuberculosis in the very young—under two years of age—is very largely fatal. The tendency toward acuteness of the disease may be said to diminish as age advances until at or about the time of puberty at which time renewed activity of the disease may manifest itself in those previously affected or clinical disease may develop in those previously infected. After the age of puberty there is rather a great tendency for the disease to be of the chronic type and acute, widely disseminated, or miliary tuberculosis becomes less common. The prognosis then becomes more or less that of adult pulmonary tuberculosis. From the twentieth to the fortieth year as far as age itself is concerned the prognosis may be regarded as favorable. After the fortieth year recovery from the disease is not so likely to happen. However, the progress is more apt to be slow so that from the standpoint of duration the prognosis is more favourable than in earlier years.

Until about the time of puberty mortality from tuberculosis is about equally distributed among males and females During the age period ten to fifteen years the mortality among females is almost double that of males Mortality among females remains in excess of that among males until about the twenty fifth year of age. After this period the males have a greater mortality than females until at least the fortieth year (U. S. Census 1914-1918, Hugh Wiley). Inasmuch as after the tenth year of life pulmonary tuberculosis becomes more frequent and meningitis less frequent it can be said that sex is of importance in prognosis particularly at certain age periods.

Pregnancy should be looked upon more or less as a complication and in the presence of active disease must be regarded as very unfavourable. The male generally the provider of home and comforts, must or will often continue in his work, unable to take proper treatment for financial reasons and of course, when this is so, the prognosis becomes unfavourable The habits of life in the male also influence the prognosis unfavorably in many instances

Outdoor workers becoming ill with pulmonary tuberculosis perhaps have a less favourable prognosis than indoor workers. Those leading an inactive mental or physical life and those accustomed to all the comforts and luxuries of life, when other things are equal usually have a less favourable prognosis than those physically or mentally active previous to the onset of the disease, or those to whose life the rest and comfort of proper treatment prove quite a change. And it is probably the stimulus of mental change as well as the rest from physical or mental exertion which favourably influences the prognosis.

Environment unquestionably influences the course of the disease. Yet it is most wonderful under what unhygienic mental and physical environment a patient may symptomatically recover from the disease.

The mind plays an important rôle in recovery from pulmonary tuberculosis. Proper treatment requires a willingness to co-operate—a willingness to do what, to the patient, often seems needless and contrary to common logic or sense. Why should he, feeling so well, remain in bed, an invalid? Not only willingness but determination and perseverance are necessary. For this reason a proper knowledge of the disease is a necessity for the patient. Needless to say cheerfulness adds to the chances of recovery. Those who react strongly to the small worries and disappointments of life necessarily have a less favourable prognosis than those who react normally to these stimuli. A lack of proper regard for the seriousness of the idicase and recklessness in heeding advice in treatment mean an unfavourable prognosis.

When the onset of the disease is sudden, the patient perhaps seeks medical advice earl'er and discovery of the cause of illness may be earlier ascertained than when the onset is slow and indefinite. Large losses of weight are unfavourable. A loss of one-fourth the usual weight should be regarded as very unfavourable and a loss of one-third the usual weight is usually accompanied by fatal disease. If, under ordinary feeding the patient gains weight especially when steady gains are made, the prognosis is good from this standpoint. When forced feeding is necessary to regain lost weight the prognosis is less favourable. Failing digestion is, of course, unfavourable. However, lack of appetite, strange to say, is fairly often accompanied by good assimilation.

The presence of fever or rapid pulse, not due to other causes, is of unfavourable significance. Activity of the disease is present and the prognosis must be accordingly made. Persistent elevation of temperature is less favourable than when recurrent although both are unfavourable. Inverse temperature elevations are of especially bad insignificance.

Absence of fever, it must be remembered, at times may mean lack of resistance as shown by other symptoms. Continued rapidity of pulse, not due to other causes, is of unfavourable significance. Cyanosis when acute and accompanied by dyspnœa, or following upon hæmoptysis, is unfavourable as an acute extension of the disease or the onset of miliary tuberculosis is most likely. Hæmoptysis may be either accidental and of little import or it may be a symptom of progressing disease. When not accompanied by fever, dyspnœa, cyanosis, or tachycardia, providing the loss of blood is not severe, prognosis may be but slightly altered.

Symptoms, as a rule, afford an index of the activity of the lesion while physical signs and the *x*-ray show the location, extent, intensity and character. Usually the apical les'on is more favourable than one situated in the centre or at the base. An extensive lesion is less favourable than one of small area and the greater the intensity (infiltration, consolidation, etc.) usual'y the less favourable the prognosis. At times the *x*-ray gives an idea of the activity of the lesion when physical signs do not, and of course the prognosis should vary with progression or retrogression of the lesion. When *x*-rays taken at intervals of three months show no change the prognos s should be favourably influenced, since apparently the disease is at least not progressing, but on the other hand may be quiescent or poss:bly "healed".

A gradual essening in amount and a change from purulent to mucoid sputum is of favourable significance. At times the amount may be increased and the character change from purulent to mucoid just preceding a lessening or cessation of sputum. Sudden diminution in the amount may be due to localized congestion within the lung, pneumonic or miliary processes, and when accompanied by unfavourable symptoms should make the prognosis unfavorable. So, too, a growing increase in quantity and a change from mucoid to purulent is of unfavourable significance. The presence of tubercle bacilli in the sputum makes the prognosis less favourable than when absent. Their periodic or permanent disappearance allows a more favourable prognosis. Tuberculous complications, of course, make the prognosis less favourable and in proportion to the severity and location of the complication. Early laryngitis, when properly treated, responds readily to treatment. Pleurisy with effusion at times is of favourable significance, especially in limited disease. In early cases pneumothorax may occur without symptoms or damage. But in advanced cases pneumothorax is a very serious complication. Enteritis, it is now believed, may be recovered from temporarily if not permanently. However, when occurring in advanced cases and when the symptoms are marked, the prognosis should be very guarded. Tuberculous empyema is a serious complication. Tuberculous meningitis, while nearly always fatal, has at times been recovered from, so, too, has Addison's disease.

To arrive at a satisfactory prognosis then we must consider the numerous factors which favourably or unfavourably influence the disease in each individual case. In part (not, however in the order of their importance) these may be said to consist of the following: age, sex, environment, personality, onset, loss and gain in weight, digestion and assimilation, elevation of temperature, fast pulse, cyanosis and dyspnœa, hæmoptysis, extent, intensity and location of the lesion, tubercle bacilli, complications, ability to receive and accessibility of proper treatment.

An idea of what may be expected in a general way in patients receiving education and treatment may be gotten from the accompanying tables formulated from the records of the Trudeau Sanatorium. Tables 1, 2, 3 are from an analysis of three hundred cases all of which had *x*-ray evidence of parenchymatous disease.

TABLE No. 1

CHANGE OF RÂLES ADMISSION AND DISCHARGE IN 300 PARENCHYMATOUS CASES

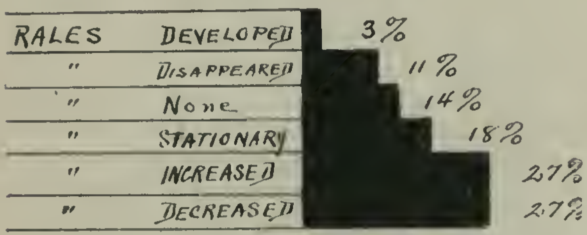


Table 1 shows the frequency with which râles were present or absent, developed or disappeared, increased or diminished in area during residence at the Sanatorium which receives almost exclusively only minimal or incipient and moderately advanced cases for periods of from three to six months. From the table it may be seen that when râles are present upon entrance the most frequent occurrence is their increase or diminution. The next likely occurrence is that they will neither increase nor diminish. In only a relatively small percentage did râles occur when not previously present or disappear when found upon admission.

TABLE No. 2

CHANGE IN *X*-RAY—ADMISSION AND DISCHARGE IN 300 PARENCHYMATOUS *X*-RAY CASES

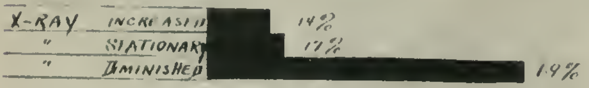
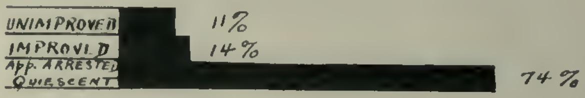


Table 2 shows the changes during treatment as seen in the *x*-ray plates. Here over two-thirds of the cases are seen to have improved. Those cases in which the *x*-ray showed no change were probably quiescent or arrested cases upon entrance.

Table No. 3 shows the discharge condition of these 300 cases. Nearly three-fourths have shown definite improvement and freedom from symptoms of activity.

TABLE No. 3

DISCHARGE CONDITION OF 300 *X*-RAY PARENCHYMATOUS CASES



During treatment of three to six months' duration of this class of cases it may be said, as a general rule, that only a small percentage of cases will lose their râles and approximately one-half will show an increase or diminution of their extent The *x*-ray will show an extension of the lesion in about one-seventh of the cases while at discharge nearly three-quarters will be free from symptoms of activity for at least the two previous months.

TABLE No. 4

RÂLES—ADMISSION AND DISCHARGE CHANGE—ALIVE 5-11 YEARS—POST DISCHARGE 979 CASES (Dr. F. B. Trudeau)

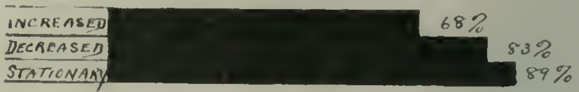


Table No. 4 has been arranged from the figures of F. B. Trudeau (*Amer. Rev. Tuberc.* Sept., 1920, iv. 7). This table shows the percentages of those living from five to eleven years after discharge in nine hundred and seventy-nine cases whose râles during treatment remained stationary, increased or decreased in area It will be seen that the greatest number of deaths occurred in the "râles increased" group and that, if anything, the "râles stationary" group has a prognosis equal to, or perhaps better than, the 'râles diminished" group.

TABLE No. 5

APPROXIMATE PER CENT. DEAD 10 YEARS AFTER DISCHARGE

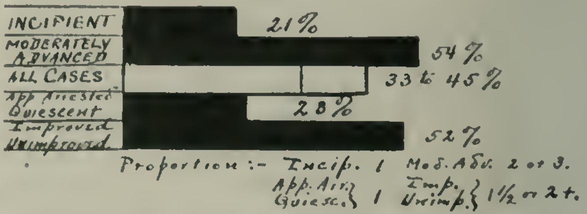


Table No. 5 shows the approximate mortality ten years after discharge among incipient and moderately advanced cases and those having been discharged as "active" (improved–unimproved) and "inactive" (apparently arrested and quiescent). The moderately advanced case, after ten years has from two to three times the mortality of the incipient and, the "active" case one and one half to two and one-half times the mortality of the "inactive" case.

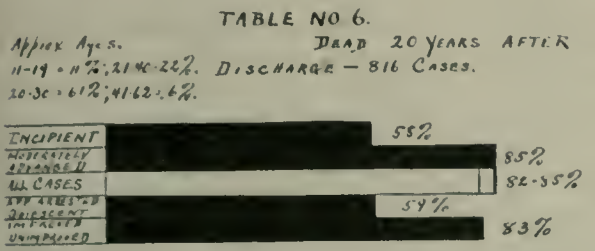


Table No. 6 shows the mortality as in Table No. 5. after twenty years. Here it is also seen that the incipient and inactive cases have a better prognosis than the moderately advanced and active cases And as in Table No. 5 the incipient cases and the "inactive" cases behave similarly, so, also the moderately advanced and "active" cases

TABLE No. 7

Cause of Death, Tuberculosis in 174 Cases 20 Years After Discharge

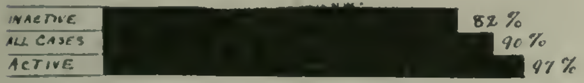
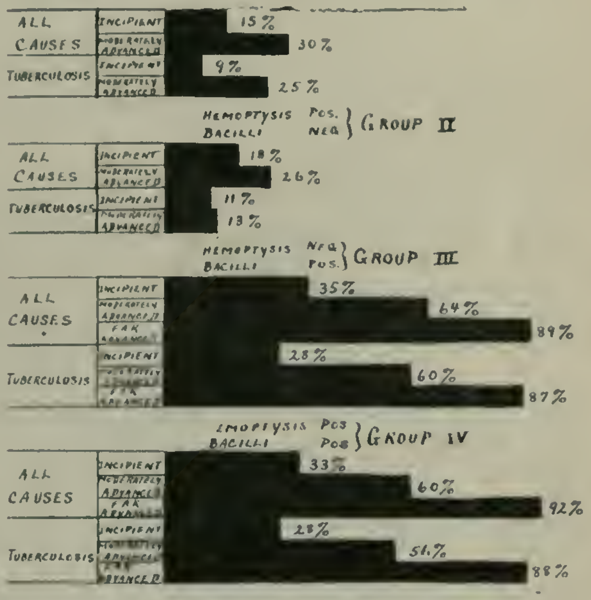


Table No. 7 gives the percentages of deaths (in those discharged twenty years) from tuberculosis in one hundred and seventy-four instances in which these facts were known. From this table it is seen that while the prognosis as to death from tuberculosis is still in favour of the "inactive" cases the difference is relatively small (15 per cent.) and that the majority of the one hundred and seventy-four cases (90 per cent) have died of pulmonary tuberculosis. The small number dealt with here is, of course, unfortunate. Of eight hundred and sixteen cases whose status twenty years after discharge was known, six hundred and sixty-three were dead and of these the cause of death was known in only one hundred and seventy-four. In 1400 more recent cases discharged ten to nineteen years, the cause of death was known in 93 per cent Tuberculosis was the cause in 89 per cent.

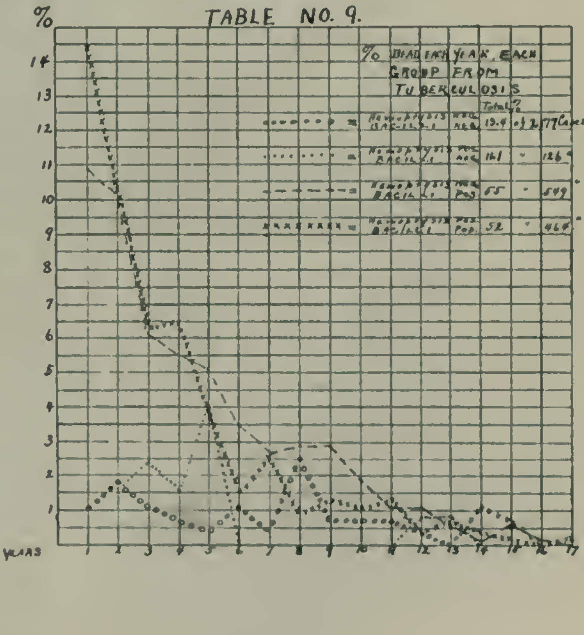
Table No. 8 shows the general mortality and mortality from tuberculosis in the incipient, moderately advanced and far advanced cases sixteen to nineteen years after discharge from the Sanatorium. The cases are subdivided into four groups according to the presence or absence of tubercle bacilli or a history of hæmoptysis of a teaspoonful or more. From the table it is seen that those cases in which tubercle bacilli were not found and in which no hæmoptysis occurred (Group 1) and those in which hæmoptysis occurred but in which tubercle bacilli were not found (Group II.) behaved similarly. And those cases in which tubercle bacilli were found whether hæmoptysis occurred or not behaved similarly

TABLE No. 8

Deaths From All Causes and From Tuberculosis in 1,000 Cases 16 to 19 Years After Discharge Hemoptysis, Neg., Bacilli, Neg., Group I.



(Groups III. and IV.). Groups III. and IV. show a decidedly unfavourable prognosis compared to Groups I. and II. So the occurrence of tubercle bacilli in the sputum must be looked



upon as of unfavourable significance It must not be inferred from this, however, that the occurrence of tubercle bacilli means an active lesion. It does mean, however that an "open" lesion is more dangerous than a closed one. Again the advantage of the incipient over the moderately advanced and of the moderately advanced over the far advanced case is readily seen.

Table No. 9 shows the percentages in each of the groups of Table 8 dying from tuberculosis in each year after discharge. The greater numbers of such deaths and their early occurrence is readily seen in the bacilli positive groups. Not only is the ultimate prognosis less favourable in the bacilli positive groups but prognosis as to duration of life is much less favourable than in the bacilli negative groups.

From all of the tables, which deal almost entirely with incipient and moderately advanced cases after three to six months' treatment, may be summarized the following:

1. Râles when present at the onset of treatment will, after three to six months' treatment, tend to either increase or diminish in over half of the cases. Only comparatively infrequently do they disppear or appear when previously absent. A fair number (about one in five or six) show no change in the area of râles heard.

2. The x-ray will show no improvement in about one of seven cases and approximately two-thirds will show definite improvement.

3. Nearly three-quarters of the cases will show freedom of symptoms of activity.

4. After five to eleven years those in whom the râles increased in area while under treatment showed the highest mortality. When rales remained stationary during treatment prognosis was not unfavourably influenced

5. Incipient or minimal cases have a better immediate and ultimate prognosis than the moderately advanced; moderately advanced a better prognosis than far advanced cases

6. Regardless of extent of lesion the cases becoming inactive under treatment have a much better prognosis than those which retain symptoms of activity

7. After the lapse of twenty years the cause of death was pulmonary tuberculosis in most of the traced cases. Those cases, which were inactive after treatment have a better prognosis than those having symptoms of activity.

8. Tubercle bacilli when present in the sputum make the prognosis much less favorable than when absent. This refers to longevity general mortality and mortality from tuberculosis, and holds true for the incipient and moderately advanced cases.

TO THE MEDICAL PROFESSION OF CANADA:

If you are requiring an assistant or planning a holiday this summer, or a few weeks off to brush up, or possibly a honeymoon, the services of a recent graduate, or a senior student in medicine, might be desired. The student body of the province of Ontario is being canvassed with reference to summer work

Should you consider utilizing one of the men available, please forward full particulars to the Secretary of the Ontario Medical Association, at 127 Oakwood Avenue, Toronto, making note of the following:

This year's graduate, or senior student;
When required;
For how long;
Assistant or *locum tenens;*
Must he be able to drive car;
Remuneration;

and any other information which will facilitate the confluence of supply and demand.

A large number of senior students will be available on June 1st.

REPORT ON THE SCHICK TEST AND TOXIN-ANTITOXIN IMMUNIZATION AT THE CHILDREN'S HOME, WINNIPEG

Gordon Chown, B.A., M.D.
Winnipeg

As little work has been done in Winnipeg with regard to toxin-antitoxin immunization owing to the fear of the reaction that might follow, this report is presented to stimulate a more general interest in the subject with the hope that all children in the various public institutions may receive the benefit of the immunity against diphtheria as afforded by toxin-antitoxin injections.

Through the interest of Dr. Gordon Bell a supply of Schick test and toxin-antitoxin was obtained from the Connaught Laboratories, Toronto.

The technique followed for the Schick test was that outlined in the pamphlet published by the Department of Health, City of New York, 1918.

Full instructions accompany each Schick outfit and little practice is required in order to become proficient in the method of administration. The test is read at the end of twenty-four, forty-eight, seventy-two, ninety-six hours. Some slight difficulty may be experienced in the interpretation of results owing to an occasional pseudo-reaction which occurs. The false reaction is seen in relatively few of the older children but in a much larger number of adults, in whom it is of importance to recognize and control both by the injection of heated toxin and by observing the clinical course of the reaction. In table No 1 is given the result of the Schick test for the various ages. The column headed "Diphtheria" indicated that these children gave a previous history of having had diphtheria. It will be noted eleven of this number gave a negative Schick reaction while seven gave a positive reaction indicating that an attack of diphtheria does not protect absolutely against another attack. In table No. 2 is given a summary by age groups of the positive and negative cases.

Table No. 1

Number Tested 156

Age	No.	Neg.	Diphtheria	Positive	Diphtheria
15	1	1	..	..	..
14.....	3	1	..	2	..
13.....	4	2	..	2	..
12.....	8	5	..	3	..
11.....	4	4	1	..	..
10.....	18	7	3	11	5
9.....	14	8	1	6	..
8	22	8	1	14	1
7.....	11	8	3	3	..
6.....	16	4	..	12	1
5.....	15	4	1	11	..
4.....	10	4	..	6	..
3½....	5	2	..	3	..
3	4	1	..	3	..
2½....	4	..	..	4	..
2.....	7	1	1	6	..
1½....	1	..	..	1	..
1.....	4	1	..	3	..
10 mos.	4	2	..	2	..
2½....	1	1	..	..	..
	156	64	11	92	7

Table No. 2

Summary of Schick Test by Age Groups

Age	No.	Negative	Positive	Diphtheria Per cent. positive
0-1 yr...	9	4	5	55.5%
1-5 yrs..	46	12	34	73.9%
5-10 yrs.	81	35	46	56.7%
10-15 yrs.	20	13	7	35%
	156	64	92	

Read before the "Group" Meeting, Winnipeg General Hospital, February, 1921.

The postive cases in this series greatly exceed those of Zingher's[1], which may be accounted for by the fact that reactions which showed a trace of redness at the end of ninety-six hours were called positive. It was thought wiser to err on this side in order to make sure of obtaining an absolute protection for the institution. One cubic centimetre of toxin-antitoxin at weekly intervals for three doses has been administered to all positive cases, and in no instance has the administration been followed by a severe reaction. Owing to a slight local reaction three of the older children were allowed to remain home from school for one day.

Some difficulty has been experienced in obtaining a satisfactory syringe that will stand the back pressure of intracutaneous injection without leaking.

The work of Park and Z'ngher of the New York City Laboratories has clearly shown the efficacy of active immunization against diphtheria and it is felt that steps should be taken to urge its more general adoption, not only in institutions, but in the schools.

1. Zingher.—*Am. J. Dis. Chil.*, Aug., 1918, Vol. 16, p. 83.

THE PROGNOSTIC VALUE OF THE STUDY OF THE BLOOD CREATININE IN NEPHRITIS

Based upon the Study of Fourteen Cases with Complete Post-mortem Examination

I. M. Rabinowitch, M.D.

LITTLE information of practical value, concerning the creatinine content of the blood, was available until Folin and Denis[1], Myers and Fine[2], first reported their observations. These authors showed that a marked increase of the blood creatinine occurs in advanced cases of chronic nephritis. Since then the prognostic value of the study of the creatinine of the blood has been repeatedly demonstrated[3, 4, 5]. Among the conclusions drawn in these communications were: That in nephritis "the blood creatinine furnishes a more reliable prognosis than any other test we possess,"[5] and that "creatinine values from 2·5 to 3·0 mgm. per 100 c.c. may be viewed with suspicion; figures from 3 to 5 mgm. may be regarded as decidedly unfavourable, while over 5 mgm. probably indicates an early termination."[3] The comparatively large series of cases reported certainly justifies the conclusions drawn, and the cases reported here, as observed in the Montreal General Hospital, are reported merely as additional data.

It will be seen from the chart that a high urea nitrogen and low dye excretion were also found in those cases where it was possible to determine these. That a high urea nitrogen content of the blood and a low dye excretion are also valuable signs of impairment of kidney function are well-established facts, but these findings do not invariably occur, even in advanced cases of nephritis. The blood urea is greatly influenced by food intake, and it may be found that even in those advanced cases, where the present illness has been in existence for any length of time, and has been associated with a loss of appetite, the diminished food intake would account for the finding of a low blood urea nitrogen on the day of admission to the hospital, whereas the creatinine being endogenous in origin, chiefly, is little influenced by food intake. The amount of dye excretion can only be accepted as index of kidney function at the time the dye is injected. It represents elimination only, and has not the same significance as nitrogen retention—the difference between production and elimination. At times in the presence of a high blood urea the dye excretion may

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From the Department of Metabolism of the Montreal General Hospital.

be normal or nearly so, and therefor no true indication of the degree of impairment of function. A retention of creatinine is, however, indicative of a marked degree of impairment of function, since it is the nitrogenous product most easily eliminated.

To judge the prognosis, however, by the creatinine, it becomes essential to correlate the clinical picture, and differentiate between (generally speaking) two types of retention, (*a*) one in which there is a gradual increase in the various non-protein nitrogenous elements of the blood; that is, an increase, first of uric acid, then of urea, and lastly of creatinine, as is seen in gradual degenerative changes in the kidney, such as occurs in chronic nephritis, and (*b*) a sudden complete retention of all products as may occur in an acute toxic nephritis, *e.g.*, bichloride poisoning, or in cases in which there is a mechanical obstruction to the urinary outflow, as may occur in urethral stricture, prostatic obstruction, ureteral stone, etc. In the latter type a high creatinine may be encountered, but with the relief of the obstruction by urethrotomy, catheterization, etc., the creatinine content diminishes. It is not due to a permanent organic lesion of the kidney, and consequently the prognosis is more favourable. In the latter type the fall in the creatinine concentration of the blood may be rapid or gradual, depending on the rate of functional recovery of the kidneys, which rate will depend upon the degree, extent and stage of the obstruction, as has been demonstrated experimentally.[6]

The two following cases will illustrate the influence of mechanical obstruction upon creatinine retention and the effect of the relief of the obstruction.

Hospital No. 5535-20. Male, age sixty-two, admitted to the Urological Service of the Montreal General Hospital with a history of anuria. Clinical diagnosis, prostatic enlargement, acute urinary retention:

Admitted	Blood urea N. mgm. per 100 c.c.	Creatinine	Phthalein. % in 2 hours
Dec. 11, 1920.........	98	3·7	..
" 13, 1920.........	89	2·7	0
" 15, 1920.........	76	2·6	..
" 17, 1920.........	60	..	..
" 31, 1920.........	42	..	..
Jan. 6, 1921.........	30	..	29
" 15, 1921.........	26	..	..
" 25, 1921.........	..	..	32
Feb. 9, 1921.........	33	2·1	..

In this case by relief of the obstruction (catheterization) the mechanical cause of the increased nitrogenous products was removed and therefor the creatinine content diminished, gradually (sixty days). The patient recovered.

Hospital No. 609. Male, age sixty-four, admitted to the Urological Service of the Montreal General Hospital February 10th, 1921, with a recent history of prostatic enlargement and retention of urine:

Date	Blood urea. Nitrogen mgm. per 100 c.c. blood	Creatinine
Feb. 11, 1921.........	62	3·6
" 14, 1921.........	23	1·6

Here it will be noted that (after repeated catheterization) the fall in the concentration of the urea and creatinine was sudden (four days).

The above two types of cases differ strikingly from the following case, a chronic nephritis, with progressive degenerative changes in the kidney.

Hospital No. 4277. Male, age fifty, admitted to the Medical Wards of the Montreal General Hospital, with an old history of chronic nephritis. The following were the findings:

Date	Urea N. mgm.	Creatinine per 100 c.c.	Phthalein. % in 2 hours
Sept. 20, 1920.......	68	5·0	6
" 24, 1920.......	66	5·0	..
Oct. 2, 1920.......	70	5·0	2
" 9, 1920.......	90	5·0	..
Nov. 1, 1920.......	80	5·0	0
Dec. 17, 1920.......	176	6·1	..
" 18, 1920.......	216	7·3	..
" 19, 1920.......	224	8·1	..
" 21, 1920.......	268	10·1	..
		Died.	

It will be noted that although the creatinine figures were high on admission, they remained constant for two months, during which period there was a gradual increase in the urea nitrogen in spite of the restricted diet on which the patient was placed.

The following is the list of fourteen cases upon which this report is based (admitted to the Montreal General Hospital). Each of these cases showed the clinical signs, and symptoms of chronic nephritis, and the diagnosis was corroborated in each case by the post-mortem examinations.

The method employed is that of Folin and Wu[7], with the preliminary purification of the picric acid.[8] The normal figures are regarded as 1·0 to 1·5 mgm. per 100 c.c. of blood.

No.	Hosp. No.	Age.	Days ill from first day, observed, to day of death	Creatinine mgm. per 100 c.c.	Urea N.	Phenolsulponephthalein % in 2 hours
1. . .	McC*	26	9	12·0	137	·6
2. . .	1320	61	4	10.4	30	2·5
3. . .	21.02	42	5	8·3	162	. .
4. . .	2616	45	5	8·2	200	·4
5. . .	4010	47	120	7·1	105	. .
6. . .	883	60	22	6·3	126	. .
7. . .	1332	?	2	6·2	112	. .
8. . .	1760	69	1	6·2	96	. .
9. . .	1378	77	32	6·0	96	. .
10. . .	1376	39	13	5·6	52	2·5
11. . .	1069	64	27	5·4	55	·7
12. . .	4049	58	13	5·1	119	·6
13. . .	4277	50	102	5·0	68	. .
14. . .	258–21	52	22	5·0	100	·0

* Bichloride poisoning.

It will be noted that although the cases are arranged according to their degree of concentration of creatinine from highest to lowest, there is not the same relation of the days of duration of disease. The striking thing is, however, that they all had an early fatal termination.

Case No. 1 of this series is a case of bichloride poisoning and should really be regarded as belonging to the "sudden retention" type. It is included in this series, however, for the reason that it was one of three cases of bichloride poisoning which were admitted to the Montreal General Hospital, and an opportunity was afforded for the study of their kidney function.

All three cases showed clinical evidence of a marked toxic effect of the drug. Two cases, in spite of the clinical picture (hæmaturia, etc.), showed only a slight impairment of kidney function and recovered. This case recorded, with the figures quoted, died.

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1. Folin and Denis.—*J. Biol. Cmen.*, 1914, 17, 487.

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3. Myers and Lough.—*Arch. Int. Med.*, 1915, 16, 536.

4. Chase and Myers.—*Jour. Amer. Med. Assoc.*, 1916, 67, 929.

5. Myers and Killian.—*Amer. Jour. Med. Sci.*, May, 1919, No. 5, 157, 674.

6. Keith and Pulford.—Exper. Hydronephrosis, *Arch. Int. Med.*, 20, 853, 878, Dec., 1917.

Bainbridge, F. A.—Effects of Ligature of one Ureter, *Jour Path. & Bact.* 11, 421-425, 1906.

7. Otto Folin and Hsien Wu.—*Jour. Biol. Chem.*, 1919, 38, 98.

8. Folin and Doisy.—*Jour. Biol. Chem.*, 1916, 1917, 28, 349.

We understand that the *American Journal of Surgery* contemplates bringing out in their May number a series of articles on "Fractures" by recognized authorities. The following is a list of the papers promised for that number: "Fractures of Tibia-end-results and Ambulant Treatment", Dr. John J. Moorhead, New York City; "Treatment of Fractures of the Humerus", Dr. Joseph Blake, New York; "Treatment of Fractures at and about the Ankle", Dr. Frederic J. Cotton, Boston, Mass.; "The Cerebral Symptoms and Operative Indications in Skull Fractures", Dr. William Sharpe, New York City; "Latent Symptoms from Unrecognized Fractures of the Vertebræ", Dr. Norman Sharpe, New York City; "Fractures of Fingers and Toes", Dr. Harry E. Mock, Chicago, Ill.; "Early and Complete Immobilization as a Factor in the Preservation of Joint Function in the Treatment of Fractures", Dr. H. Winnett Orr, Lincoln, Nebr.; "Intertrochanteric Fractures of the Femur", Dr. Kellogg Speed, Chicago, Ill.; "Bedside Radiography in Fractures", Dr. I. Seth Hirsch, New York; ' Fractures at the Head of the Radius", Dr. James Morley Hitzrot, New York; "Traction—Suspension—Apparatus", Dr. Henry H. M. Lyle, New York; "Pott's Fracture of the Leg", Dr. W. L. Estes, So. Bethlehem, Pa.

SOME UNFORTUNATE SEQUELÆ OF SUPRAPUBIC PROSTATECTOMY

G. S. Gordon, M.D.

Vancouver

THE sequelæ in question are the result of continued obstruction to urination and manifest themselves as dysuria with or without concurrent lithiasis and the more remote consequences of back pressure, chronic uræmia and chronic septic absorption.

Obstruction of some degree persists after most prostatectomies although usually overlooked by patient and surgeon alike—by the former because he is an old man, whose ambition for perfection is of the past and who is grateful for improvement in a life of misery; by the latter because he has been too easily satisfied with his patient's assurances and consequently has given the matter less thought than it deserves.

The degree of obstruction and the character of a local concurrent infection determines the severity of symptoms. Should obstruction be of slight degree and infection of a comparatively non-irritant nature such as is produced by colon bacillus there is no marked inconvenience complained of. The same amount of obstruction associated with infection by staphlylococcus albus or proteus bacillus subjects the patient to ammoniacal phosphaturia and secondary lithiasis. Phosphatic stone may form in a residual urine pouch back of the obstruction. So little exacting are old people that the surgeon is often not called to see them till stone has formed; although a period of marked dysuria must have preceded. Finally, obstruction may be so marked that urination is a dribble or no urine at all may evacuate itself through the urethra but only through the supra pubic fistula. Unhappy indeed is the man who, in addition to this, has an ammoniacal urine.

Urinary back-pressure from obstruction lessens the renal capacity for excretion and mild or severe "back-pressure uræmia' persists. Under such conditions the walls of the upper urinary tract are less resistant to infection and septic products are absorbed causing chronic toxæmia from this source.

After prostatectomy there remains dorsally and laterally to the vesical outlet a flap of bladder wall covered by trigone and mucous membrane above, denuded below and unsupported by its previous prostate contact. At its free edge is the vesical outlet which normally closes by contraction of certain circular fibres of the bladder wall—the so-called internal sphincter. The anterior attachment of these sphincteric bundles is undisturbed at prostatectomy and resumption of function, which follows promptly after, draws the free margin of the undermined vesical flap forward. This flap is bounded by the vesical orifice anteriorly, the ureteral orifices posteriorly and the margins of bladder attachment on the sides. Inferiorly, well illustrated in Cuthbert Wallace's book on prostatectomy, is the prostatic cavity into which, from weight of urine above, bellies the central part of the flap. This is what happens after prostatectomy, unless the internal sphincter has been destroyed, and it is in this pouch above the flap that residual urine stagnates and, with favourable infection, stone forms there. The sphincter edges which have been denuded at operation may become coapted and stricture occur here or they may even heal solidly together in this position causing absolute retention.

In a paper read before the North Pacific Surgeons Association in December, 1915, and published in *Surgery, Gynæcology and Obstetrics*, May, 1916, the rôle of the internal sphincter of the bladder in these cases of post-operative obstruction was called attention to with five illustrative cases and a remedy suggested. Subsequently Denslow, of Kansas City, reported another five such cases and independently suggested practically the same treatment. Quite recently Thomson-Walker of London states that for four years past he has taken similar measures to defunction the internal sphincter after his prostatectomies.

Since this addition to prostatectomy in 1915 my own results, so far as post-operative obstruction goes, have been satisfactory.

The five cases (including two of complete obstruction) on which the original paper was founded, appear therein *in extenso.* To these five I have to add two others as follows:

B. 14-4-18. In 1914 a retired Anglo-Indian gentleman of about sixty, who had had a suprapubic prostatectomy about a year previously, was referred to me for dysuria and hæmaturia. A suprapubic cystotomy was done and a phosphatic stone the size of a duck's egg removed; but no attention was paid to the obstruction at the bladder outlet. I have recently seen this patient and he is content; but his son who lives with him. thinks he should come to see me again for dysuria, provided that I can offer any help without further operation. Evidently the result of these two operations is not ideal and the cause is not far to seek.

In March 1920, H 20-3-15, a vigorous, well-preserved Alberta farmer of seventy-seven was referred to me. His urination was merely a forced dribble although prostatectomy had been done two years previously. As was demonstrated on examination this prostatectomy had been a thorough enucleation. Even immediately after operation, however, urination could not have been satisfactory because sounds were passed from time to time till within a few months of his being referred to me. By none of the usual methods could the opening into the bladder be found. The patient was endoscoped and the bulkhead between bladder and prostate cavities explored. Methylene blue had been previously administered and when the patient forced a few coloured drops of urine through the internal sphincter the opening was thus identified. Through the endoscope a filiform was then passed into the bladder and the endoscope withdrawn. An Otis urethrotome was screwed on to the filiform and made to follow it till the knife was in the bladder. The urethrotome was dilated to 30 (French) and the knife drawn through the internal sphincter on the floor. The subsequent stream was full size but unfortunately, owing no doubt to coincident dilatation of the external sphincter, partial incontinence followed.

A recent report from him, however, intimates that the internal sphincter is no longer obstructing and that the external sphincter has fully recovered its tone.

At prostatectomy, after the new growth has been enucleated, it is a simple matter to catch the margin of the internal sphincter which lies between the bladder and prostate cavity in a forceps, slit it on each side with scissors and apply the bladder flap thus freed to the floor of the prostate cavity by drawing a Hagner's bag into the prostatic urethra (this bag holds the flap in place and stops bleeding) or simpler still, follow Denslow's or Thomson-Walker's technique of a single slit in the mid line of the sphincter thus making two lateral triangular flaps instead of a single quadrilateral one.

If this precaution is taken at prostatectomy one can feel sure of having the base of the bladder on a level with the outlet, there will be no residual urine to perpetuate infection, or in which stones may form, no straining to urinate with its resultant back pressure on bladder, ureters, renal pelvis and kidneys and less tendency to protusion of hæmorrhoids or hernia.

References:

Denslow.—Recurrence of Urinary Obstruction after Prostatectomy. *Jour. A. M. A.*, 1918.

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NOTES ON NIGHT BLINDNESS AT THE FRONT

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NIGHT blindness is the condition in which sight is good by day, or with good illumination, but deficient at night, or with reduced illumination (May). If by drawing the curtains we darken the room to such an extent that the examiner can still read medium-sized print, the patient will perhaps no longer recognize the larger letters, or may stumble against chairs or other objects while walking about the room (Fuchs). The degree of disability may be accurately measured by such an instrument as Fœster's photometer.

Night blindness is a symptom occurring in various ocular diseases: (a) Opacities of the media. Peripheral opacities of the cornea and lens may project into the enlarged pupil, and thus interfere with peripheral vision, and: (b) Diseases of the light perceiving apparatus. Ophthalmoscopic signs may or may not be present. In retinitis pigmentosa there is an atrophy of the pigment epithelium, which apparently checks the formation of the visual purple upon which the light adaption of the eye is largely dependent. The histological change is one of extreme vascular sclerosis, both of retinal and choroidal vessels (Collins and Mayou). The outer portions of the field are involved first, and consequent loss of peripheral vision may be so marked that patients must often be led about at dusk. Night blindness is a not uncommon symptom also in disseminated choroiditis, and indeed in syphilitis retinitis in general. It is found in retinitis punctata albescens; and Fuchs has mentioned it as being the first symptom of the disease in gyrate atrophy of the retina.

In such conditions with ophthalmoscopic evidence of disease, abnormal dimness of vision in subdued lights can readily be understood, but it is rather to cases exhibiting this symptom unassociated with fundus signs, that I wish to draw your attention. Collins and Mayou state that "a prolonged exposure to reflected light from sea or desert plains, etc , may, in badly nourished individuals cause night blindness." This appears to be more common in tropical climates, and improvement soon takes place by protecting the eyes from bright light, and by improving the nutrition. The condition has been called torpor retinæ, and is analagous to the prolongation of the normal temporary failure of sight experienced in passing from a strongly lighted place to a dark one. Fundus findings are negative, and the condition would appear to be a failure in reformation of visual purple (Collins and Mayou). Torpor retinæ also may be found in association with xerosis of the conjunctiva, but apparently the two have no other connection than that both are symptoms of a reduced state of nutrition of the eye-ball. The condition has been observed also in starvation, profound anæmia, and scurvy, jaundice, intermittent fever, chronic alcoholism, and pregnancy.

There are a number of points of interest in the physiology of vision in dull illumination (Scotopia). These have been brought out by Parsons in his commentary upon the writings of Nagel and von Kries. "Dark adaption is a relatively slow process. It is characterized by a rise in the sensitiveness of the retina to light, which is slow during the first ten minutes of exclusion of light from the eyes, rapid during the following twenty to thirty minutes, and again slow or almost negligible after that period. The general character of the curve of retinal sensibility is the same in all cases, but there are marked individual variations in the rapidity and amount of the rise, thus explaining the fact that some people see very much better in a dull light than others, though variations in the size of the pupils and other factors are not without importance in this respect. In night-blind people there may be only a very slow rise, the ultimate sensibility after an hour being near the normal limit. In severe cases there is very little use after several hours."

Very short exposure to bright light, viz.: striking a match, causes a temporary fall without materially altering the course of the curve. The increase in sensibility after prolonged dark adaptation is more transient than the increase during the first hour, *i.e.* it is more quickly and completely abolished by exposure to light.

Besides this temporal variation in the sensitiveness of the retina, there is a well-marked spatial variation. In the condition of light adaptation the fovea is the most sensitive part of the retina—while in dark adaptation it is the least sensitive. In other words the fovea is a region of physiological night-blindness (von Kries). Parsons goes on to show that this relative central scotoma in dark adaptation was long ago recognized by astronomers, who noticed that stars of small magnitude were seen better if viewed somewhat eccentrically. In the case of the Pleiades, for example, direct fixation shows four or five stars only, while by indirect fixation a number of weaker stars become visible Although relatively night-blind to the periphery, the fovea is capable of a slight degree of dark adaptation. The peripheral rise in retinal sensibility is rapid, from 1 degree to 4 degrees around the fovea, then slow to a maximum between 10 degrees and 20 degrees (Brener and Pertz), beyond which it falls. It has been shown by various observers that the rise of the curve of sensibility in dark adaptation varies with the size of the area of retina stimulated, and with the nature of the light; also that sensibility is about twice as great with two eyes as with one (binocular summation of stimuli). It is pointed out that scotopia is in every way allied to total colour-blindness. After a prolonged stay in a feebly-lighted room coloured objects are viewed in a dim light. The colours cannot be distinguished, but all appear to be of various shades of gray—that is to say, the eye is totally colour-blind. The differences exhibited by photopia and scotopia are so great as to suggest that they are carried out by different retinal mechanism. According to the duplicity theory of von Kries, the rods are the organ of scotopic vision, and the cones of photopic vision. The strongest argument in favour of this theory appears to be the fact that the visual purple is limited to the rods, and that the curve of chemical sensitiveness of this substance coincides with the scotopic luminosity curve.

As might be expected, the problem of night-blindness was relatively a more important one in the late war than in ordinary civil life. At the Front the night was often the time of greatest activity,—of patrols, wiring parties, collections of wounded, trench reconstruction, and forwarding of supplies to the line—and all this work had to be carried on, frequently over a difficult terrain, in complete darkness. In ordinary life, the individual generally has the assistance of artificial light after dusk.

From the earliest days of the war, medical officers were called upon occasionally to deal with men complaining of special difficulty in seeing after dusk. Personally I had met with a few of these in the 1st Canadian Division in France; but it was not until 1917 that the opportunity of making an extensive study of the problem presented itself. In the summer of that year, the D.D.M.S. of the Canadian Corps, now consisting of four Divisions, decided to try the experiment of making the Corps self-sufficient in its ophthalmic work, as far as this might prove practical. He accordingly asked Lieutenant-Colonel John Gunn, of Calgary, and myself to set up an eye clinic where we could see a sufficient number of cases and report upon the advisability of the project. This was done, and about one thousand men complaining of ocular troubles were examined. Amongst these, complaints of night-blindness were not infrequent. For example, a soldier who had been on a working-party at night had been noticed by his sergeant to fall into shell holes in the path, which were avoided by the others. In only a very few did one find any ophthalmoscopic evidence of disease—one or two cases of retinitis pigmentosa, and other forms of retinal degeneration, due to traumatism, etc. A large percentage was suspected of malingering. If in routine examination the visual acuity was good, the fundus normal, and there was no error of refraction, the case became one of discipline to be handled by the platoon commander, after the regimental medical officer had been notified of the facts. A little watching of the man might show a distressing night-blindness in the line, which resolved spontaneously as he sped through the darkness to an estaminet when the regiment was out in rest. In most instances where regimental observation seemed to have established a real disability for night vision in a man, it was found that there was an error of refraction present. This was especially noticeable in cases of hypermetropia, either with or without astigmatism. The explanation would seem to be that the smaller pupil of the hypermetrope interfered to a more or less marked degree with the peripheral field of vision. Absence of accurate focus of light rays on the retina due to any marked refractive error, however, seemed to cause disability in dim lights. Correction with suitable glasses proved very satisfactory. I do not believe that any cases of torpor retinæ due to malnutrition were observed; the rationing of the Army was much too good. Neither do I consider that fatigue was *per se* a factor in producing the symptom.

One feature in trench life was the nightly illumination due to star shells and Verey lights. These produced a very intense white light, followed by a flickering which was extremely disturbing to the eyes; and their extensive use must have interfered to a very marked degree with the process of dark adaption. It would seem that even amongst "normal" eyes, some are physiologically more night-blind than others, and all such would be at a special disadvantage under these circumstances. A few cases which seemed to come under this category presented themselves, and I was able to satisfy myself, by a test after a suitable time in a subdued light, that their dark adaption was sub-normal.

In conclusion it might be said that although the problem of night-blindness was of more importance in war than it is in civil life, it is of sufficient interest to encourage further research. Variations from the normal, from several causes, would appear to be not uncommon.

CONCLUSIONS

1. True night-blindness at the Front, unassociated with signs of disease was chiefly due to errors of refraction.

2. Intermittent glare from star-shells, etc., interfered with normal dark adapation.

3. Normal eyes may exhibit physiological variations in power of dark adaption.

HELP

MANY medical students of the senior years, also several 1921 graduates, have made application for appointments during the coming summer.

Graduates:—Available in June for indefinite periods.
Undergraduates:—June till October inclusive.
Locum Tenens:—For whole summer or shorter periods, suggesting One Hundred Dollars per month as remuneration.
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For the convenience of the profession and the students, the office of the Ontario Medical Association situated at 127 Oakwood Ave., Toronto, has undertaken to act as a clearing house. Further particulars will be found elsewhere in this issue. Hospitals requiring internes are also invited to use the service.

The whole plan is an experiment, never having been undertaken previously, so far as can be ascertained. It appears to have particularly appealed to the students. The response from the profession will obviously indicate success or failure of the undertaking.

CANADIAN MEDICAL ASSOCIATION MEETING, HALIFAX, JULY 5th-8th, 1921

THE PHYSIOLOGY AND PHARMACOLOGY OF THE MAMMARY GLANDS

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THE mammary glands consist of branching tubes lined with a cubical to columnar epithelium. The best authorities agree that the milk is not produced by a process of cell degradation or breaking down, but is a secretory process such as occurs in other glands or in the kidney.

The glands are phylogenetically and embryologically from the same source as the other glands of the skin. They are abundantly supplied by nerves, branches of the subclavicals and intercostals. The sensory nerves are abundant, especially from the mammilla, and their reflex connections in the central nervous system are important. No secretory nerves have been demonstrated. Many attempts to obtain secretion by electrical stimulation of the nerve trunks to the glands have been made, but always without success, Röhrig[49]. Even drugs like pilocarpine, Hammerbacher[23], and MacKenzie[39], and physostigmine, which cause the other skin glands to secrete abundantly, fail to produce an effect here. Yet the following phenomenon has often been observed. If both breasts are well filled with milk, and the baby put to one of them, the other breast gives a spurt of milk and may even flow for some minutes. This effect can only be reflex, yet the efferent nerves producing it cannot be found. Anger, fear and worry are supposed to produce failure in milk production, and Mironow[41] in a long and careful series of experiments on goats, showed that pain did decrease the flow. Although pilocarpine, the great stimulator of skin secretion, fails to produce secretion, atropine, its antagonist, which decreases skin secretion, will also, even if given intravenously, decrease the secretion of milk, according to Hammerbacher[23]. MacKenzie[39] could not confirm this observation.

Goltz and Ewald[22] found that bitches whose spinal cords were destroyed had a normal development of the breasts when they became pregnant, and secreted milk in a normal fashion. Mironow[41] found that on denerving a gland, it secreted only 35 per cent. to 45 per cent. of the milk given by the other glands of a goat, but this gland, when the goat again became pregnant, seemed to produce a normal amount of milk. Eckhardt[12] had the same result in an experiment performed by him. Ribbert[47] transplanted a gland to the ear of a rabbit, which gave milk when the rabbit gave birth to young. Pfister[44] confirmed this observation. A nerve connection is not essential.

For the growth and development of the mammæ, functioning ovaries are necessary (possibly the testes have the same action), but after lactation is established, removal of the ovaries does not lead to the disappearance of milk. The presence of the corpus luteum in the ovary, the fœtus in the uterus, or the placenta, have all been supposed to be causes of the marked development of the glands during pregnancy, and the expulsion of the placenta is supposed by Hildebrandt[29] to remove the source of production of an inhibitory substance which hinders lactation until after child-birth. D'Errico[10] injected blood of pregnant bitches into lactating ones and inhibited secretion. MacKenzie[39] believes that he confirmed this observation. He found that if he injected pituitary extract at half hour intervals, the amounts of milk given in response to each injection declined but slightly. If, however, before giving his second injection of pituitary, he gave an injection of an extract of either placenta or fœtus, the second injection of pituitary produced very small response, smaller than the third one. Lactation can be produced before delivery, however, by having a baby nurse at the breast. Starling and Claypon[55] made repeated injections of extracts of fœtus into virgin rabbits and saw a development of the mammary glands, and in time a few drops of a watery milk-like secretion could be expressed. These experiments have been repeated by others, Foa[17]. Biedl and Konigstein[5] implanted placenta in the peritoneum without effect on gland development. Embryo similarly implanted caused a growth of mammæ, but no milk. They found injections of fœtal extracts more successful. These experiments are, however, not very convincing, as Heape[28] reports that a similar development of the breasts occurs not infrequently in bitches "lined" at the œstrus, but not successfully impregnated, at or about the time that delivery would have occurred had they become pregnant. Cases, too, have occurred in which milk has been secreted in non-pregnant animals and women who have suckled young. Hill[31] got 120 c.c. milk from a virgin kid which was milked at intervals for three months, yielding in all 1900 c.c. In the case of Rosa-Josepha Blazek, pygopagous twins, when one became pregnant, both lactated. We know as little of the endocrine causes of milk secretion as of the nervous cause. It is true that pituitrin does cause a secretion of milk, Ott and Scott[42], Schafer[51], and MacKenzie[39]. It has been suggested that this is entirely due to the known effect of pituitrin on smooth muscle, which it causes to contract, and that milk already secreted is only expelled by the contraction of the ducts. I do not consider that there is any experimental evidence for this, and Hammond[24] believes he has disproved it. If the gland be forced by pituitrin to produce an excess of milk at any one milking there is a corresponding decrease at the next, Gavin[20], Hammond[24]. Pituitrin cannot be used to produce a steadily increased milk supply. Lederer and Pribram[37] obtained a similar increase in milk on injecting a placental extract. Basch[3] and Bouchacourt[6] have both claimed that placenta fed to patients increased the milk production. Their work has met with little credence or support from other observers, and it is possible that they did not exclude psychological factors. Some increase in milk supply is obtained by injecting extracts of corpus luteum, pineal gland, lactating mammary gland, involuting uterus, Schäfer[51] and MacKenzie[39], but this is like the pituitary increase, very evanescent.

Suckling or its equivalent is necessary to produce and maintain the milk supply. The milk secreted during suckling is richer than that lying preformed in the gland, Hardy[26], Ackermann[1]. Short periods between suckling increase the fat content alone, Crowther, Linfield, and Lipman[9], but in time seems to decrease the amounts. It appears that the gland is unable to secrete against positive pressure and milk retained in the tubules prevents milk production.

We know of no drugs nor glandular extracts which produce an increase in the milk supply and the claims of pharmaceutical houses to this effect should be disbelieved. Tonics which increase food consumption will, however, increase the milk supply.

Important constituents of the milk are lactose, caseinogen, lactalbumin, globulin, and fat. The lactose is excreted in nearly constant quantities throughout lactation and even occurs in the colostrum in the same quantity as in milk. As long as the mother is not starving this factor remains practically constant. The lactose seems to be derived from the glucose of the blood stream, Porcher[45], Paton and Cathcart[43], Kaufmann and Magne[34]. Foa[17] showed that an extirpated mamma perfused with a balanced saline and glucose produced lactose. Lactose increased temporarily with glucose feeding, Brieger[7]. Adding an excess of carbohydrate not only did not increase milk production, but decreased it, Ssubotin[54], Kemmerich[35], Stohmann[56].

The protein substances show a much wider range of variation, seasonal, Sherman[52], possibly diurnal, Richmond[48], and certainly vary with the protein richness of the diet. The protein, indeed, seems to be the controlling factor. Hoobler[32] showed that the best milk ration in man contained one of protein to six of carbohydrate and fat. Animal proteins are better than vegetable, nuts being the best vegetable, and milk the best of all. Milk cannot be produced unless adequate supplies of protein are furnished as food. Any increased milk production must be accompanied by increased protein consumption if it is to be sustained, Ssubotin[54], Kemmerich[35], Stohmann[56], though milk may remain approximately constant even if the animal is out of nitrogen balance, Hart and Humphrey[27].

The fats show the greatest range of variation, and their production varies with the season and climate, and readily with change of diet. Fats fed in excess of a normal diet increase milk production and fat content temporarily, but not permanently. The fat in the milk is derived both from the food consumed and from fat deposits. Gogitidse[21] showed that a fat with high iodine value, for example, linseed oil, if absorbed by a sheep in quantities, led to a prompt increase in the iodine value of the milk (within twenty-four hours), but that on stopping feeding, the iodine value would remain high for days, and that at the end of twenty-three days the iodine value of the depot fat was still above normal. That is, the excess fat was in part secreted, in part stored. The fat of the milk comes partly from food, partly from the depots. Maercker and Albert[40], Rhodin[46], and Bartlett[2] also have shown that fat-rich rations increased milk supply temporarily and then decreased it. Foa[17] showed that the extirpated perfused pig's gland, when supplied with fat (olive oil) in emulsion, excreted fat in the milk, but could not do so if supplied with soaps or acid fatty acids. These experiments are contradicted in part by the experiments of Hill[30] on cattle, who obtained an increase of 0·2 to 0·3 per cent. on feeding cotton seed oil, but not with other fats, and by the long and numerous researches carried out by Fingerling[16] and his co-workers, who obtained an increased milk and fat production by replacing the barley meal of a mixed diet fed to cows by rice meal, which is richer in fats. The other constituent factors of the food may have affected the results in this case. It may be noted that these workers obtained a distinct increase in milk production by adding to an unappetizing diet of hay, caraway or anise, which led to an increased food consumption by the animals. Tonics and appetizing food readily produce the same effect in man.

The phosphorus content of the food may affect the milk in spite of the large reserve supplies in the bones, Forbes, Beegle, et al [18], in cows losing calcium, magnesium, phosphorus, the milk production was maintained, but may fall, as in cases by Jordan, Hart and Patten[33]. The calcium content remains under all conditions fairly constant. Cow's milk contains 0·4 to 0·7 mg. iron per litre, human milk 0·8 to 2·1 mg., Edelstein and v. Csonka[13], but this quantity may fall in unhealthy mothers. The iron supply of the milk is barely sufficient for the child's health if it be nursed longer than about eight months, and if the iron content fall anæmia of the child may occur. I should not forget that the milk contains both water-soluble and fat-soluble vitamines and antiscorbutic substances. Ehrlich and Brieger[7] have shown that it may contain antitoxines, Woodhead and Mitchell[59] opsonines.

If no drugs influence milk secretion, many are excreted in the milk, but the literature is scanty and poor. In many cases toxic symptoms in the child have led to its detection. Quantitative estimations are rare. Amongst the drugs secreted and qualitatively, at least, detected chemically, are alcohol, Rosemann[57], according to Voltz[50] not more than 0·38 per cent. even in large doses; iodine, Lewin[38], Bucara[8], enough to cause effect on child; salicylic acid, Lewin[38], Bucara[8]; antipyrin, Lewin[38] Bucara[8]; phenacetin, Lewin[38]. Quinine, according to Lewin[38] passes over into the milk, and affects the child if the mother takes the quinine on an empty stomach, but not if it is full.

Bucara[8] showed that arsenic passes over into the mother's milk, and Lewin[38] quotes a case in which, after 8 mgm. of arsenic had been taken daily for six days, 0·001 gm. (1/60 gr.) arsenic in 100 gm. (3 oz.) milk was found. Erben[14] refers to cases of arsenic poisoning due to cattle eating arsenic-poisoned grass.

Mercury passes over into the milk, if given as calomel, but not by inunction, Bucara[8]. Over eighty years ago, according to Lewin[38], goats were given mercury inunctions in order that the mercury secreted in their milk might be given to syphilitic babies. Klink also detected mercury in human milk in 1876.

According to Hammond[25] sulphonal taken by the mother caused symptoms in the child.

Evans[15] in 1885 reports a case in which a mother took tincture of opium for three days after child birth, and the next day nursed the child, which died with symptoms of opium poisoning. A similar case is reported by Fürst[19]. The passage of morphine has been proved chemically in animal experiments, as has that of atropine.

Rhubarb passes over into the milk, giving it a yellow colour, and purging the child, as does the jalapin from scammony. Both these have been chemically detected, Lewin[38].

Bucara's[8] observations were all made on women taking therapeutic doses of various drugs. He detected iodine, mercury, arsenic, bromine, sodium salicylate, aspirin, but not cascara, senna, phenolphthalein, rhubarb, opium, hyoscyamine, and several others. Poisoning has occurred also from the milk of animals which have eaten colchicum-autumnale, hellebore, veratrum, hyoscyamus, belladonna, datura, amanita, ergot; copper, lead, and antimony consumed by animals have caused poisoning in those who consumed their milk, Erben[14].

May I sum up our knowledge for practical working purposes? First, we may feel quite certain that we cannot increase a failing milk supply by drugs or glandular extracts, but that we can do so in many cases by attention to the mother's diet. She must take plenty of foods, especially protein, she must digest the same. She must be free from worry and fatigue. She must encourage the baby to suckle strongly and persistently. She must not worry if the milk supply goes off somewhat for a day or two, as with care it will recover.

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A REVIEW OF THIRTY-THREE CASES OF FOREIGN BODIES IN THE ŒSOPHAGUS, BRONCHI AND LARYNX

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Of the thirty-three cases forming the basis of this review, twenty-seven occurred in the writer's experience during five years of special practice; notes and full histories of the other five were furnished me by my colleague, Dr. S. W. Prowse, whom I wish to thank for his kindness in this matter.

Ætiology. The direct causes of these accidents are numerous and I shall endeavour to give briefly only those most common according to my own experience. In both œsophageal and bronchial cases in children two important facts stand out: (1) The habit of allowing children to place all sorts of foreign bodies in the mouth while at play; (2) Some emotional crisis causing a quick intaking of air, as in laughing, crying, shouting while running, etc.

In adults, common causes are: (1) Imperfect mastication of food owing to carelessness and too rapid eating, and to imperfections in the teeth, or absence of the same. (2) To these must be added imperfect preparation of food whereby pieces of gristle, bone, or other foreign substances may be served. (5) The presence of tooth plates may be a contributing cause in lessening the sensibility of the mouth. (4) Some foreign bodies are inhaled during periods of sleep or unconsciousness. I have one case in which a complete tooth-plate became detached during sleep and lodged in the œsophagus; another where a small plate became dislodged and was inhaled into the left bronchus, and still another where a man was supposed to have fallen in an epileptic fit and inhaled a tooth-plate. (5) Instances are quite numerous where a tooth has escaped into the lung during extraction under general anæsthesia. (6) Jackson also mentions occupational accidents as where a lather fills his mouth with small nails and, bending his head, swallows one or more of the same. Dressmakers often place pins in the mouth and these escape downward in the same way.

Symptoms of œsophageal foreign body. In children there is a history of the child playing with some foreign body in the mouth, combined with a sudden emotional disturbance—crying, shouting or laughing. This is followed by a period of coughing, choking and maybe vomiting, which lasts continuously for a considerable time, maybe half-an-hour, to be followed by a period of intermittent coughing and choking, which may be present for the next twenty-four hours or longer, when the child is awake. In adults the usual history is that of having swallowed a foreign body, such as a tooth-plate, meat bone, or gristle, during a meal or a period of unconsciousness, to be followed by a series of spasmodic efforts to expel the intruder.

Difficulty in swallowing. This may be partial or complete, depending upon the completeness of the occlusion. In the case of disc shaped bodies in either children or adults, liquids pass, but solid food sticks or is regurgitated. The same applies to any irregular-shaped body, as a large tooth-plate. This is the main symptom in all cases.

Increased flow of mucous. Is present in the early stages in practically all cases, and is more pronounced in total occlusion and after ulceration and erosion have occurred. The spitting of pus may also occur.

Dyspnœa, reflex cough and fits of cyanosis may occur in cases of large foreign bodies, which press upon the larynx or tracheal wall, which is membranous upon its posterior aspect. One may thereby be deceived into thinking that the intruder is in the larynx or trachea, and it is not possible to say offhand in all cases where the body is situated.

Pain is usually not complained of, and is not considered a prominent feature in these cases. On the other hand, these patients often say they have a feeling of discomfort low down in the neck, and will tell you about where they consider the body is to be found. In cases of perforation of the œsophageal wall pain is a prominent feature. This is situated behind and may radiate downwards into the region of the stomach, and is first of a spasmodic character. There is also in these cases emphysema under the skin at the base of the neck.

Symptoms of foreign bodies in the bronchus. The initial attack following the accident is marked by severe coughing spells, cyanosis, and symptoms of obstruction to the passage of air. This attack lasts a variable time, or until the foreign body becomes definitely located. In case of laryngeal bodies there is loss of voice or extreme hoarseness and copious outflow of mucous in addition. In the later stages of foreign bodies in the bronchi the usual symptoms are cough of an intermittent character and expectoration. This is at first of a mucous character, but later becomes mixed with pus. There may also be attacks of severe cyanosis. This I have known to occur upon change of position of the foreign mass. A bronchitis localized to some particular part of the lung, is always suspicious of the presence of a foreign body. Mistakes have often been made, and a diagnosis of tuberculosis has been given.

Diagnosis The routine examination of cases suspected of harbouring foreign bodies, proceeds as below:

1. A careful history of the case. 2. Examination of the pharynx and larynx by means of mirrors. 3. Examination of chest by a competent internist. 4. Examination by fluoroscope and *x*-ray. A negative *x*-ray picture does not exclude a foreign body, as many bodies are pervious to the rays and cast no shadow. An atelactectic lung or lobe of same, suggests complete occlusion of the main bronchus, or branch-supplying lobe. 5. The *x*-ray is invaluable in localization. A picture showing disc-shaped body, with wide diametre from side to side, indicates a foreign body in the œsophagus. If the wide surface is anterioposterior, it is in the larynx or trachea. An oblique position of foreign body in thoracic region

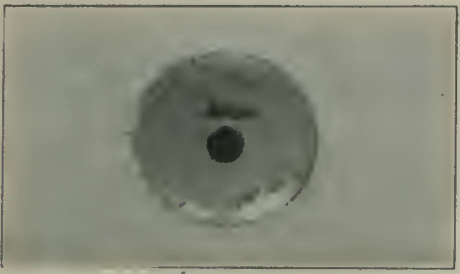
SYNOPSIS OF CASES

No.	Sex	Age	Length of Sojourn	Foreign Body	Result	Instruments	Anæsthetic	Situation
1....	Female	2½ years	8 hours	Canadian cent	Cure	Brenning's	Chl. & Ox.	Œsophagus
2....	Male	1½ years	24 hours	Canadian cent	Cure	Brenning's	Chl. & Eth.	Œsophagus
3....	Male	50 years	24 hours	Fish Bone	Cure	Brenning's	Cocaine 10%	Œsophagus
4....	Male	37 years	12 hours	Dental Plate	Death	Brenning's	General	Œsophagus
5....	Male	5 years	3 days	Head of safety pin	Cure	Brenning's	General	Bronchus
6....	Male	1½ years	3 days	Peanut kernel	Cure	Brenning's	General	Bronchus
7....	Female	2½ years	2 days	Bean	Cure	Jackson's	None	Bronchus
8....	Male	4 years	7 days	Canadian cent	Cure	Brenning's	None	Œsophagus
9....	Male	41 years	6 hours	Gristle and food	Cure	Brenning's	General	Œsophagus
10....	Male	5 years	1 day	Canadian cent	Cure	Brenning's	None	Œsophagus
11....	Female	2½ years	10 months	Melon seed	Cure	Jackson's	General	Bronchus
12....	Male	3¼ years	4 hours	Safety pin	Cure	Jackson's	None	Œsophagus
13....	Female	1½ years	3 days	Brass button	Cure	Jackson's	General	Œsophagus
14....	Male	36 years	5 hours	Meat cartilage	Cure	Brenning's	General	Œsophagus
15....	Male	27 years	8 days	Oatmeal	Cure	Jackson's	Cocaine	Œsophagus
16....	Male	9 years	6 days	Pencil top	Cure	Brenning's	Gen. & Local	Bronchus
17....	Female	2 years	4 hours	Canadian cent	Cure	Jackson's	None	Œsophagus
18....	Male	2 years	2 days	Canadian cent	Cure	Jackson's	None	Œsophagus
19....	Female	24 years	4 hours	Bolus & cartilage of meat	Cure	Brenning's	General	Œsophagus
20....	Male	3 years	3 days	Canadian cent	Cure	Brenning's	General	Œsophagus
21....	Male	2 years	3 days	Plum stone	Cure	Brenning's	General	Œsophagus
22....	Female	5 years	1 day	Canadian cent	Cure	Jackson's	General	Œsophagus
23....	Female	43 years	30 days	Tooth plate	Cure	Jackson's	General	Bronchus
24....	Male	11½ years	14 days	Screw nail	Cure	Jackson's	General	Bronchus
25....	Female	58 years	4 hours	Chicken bone	Cure	Indirect	Cocaine 10%	L. Bronchus
26....	Female	19 years	2 days	Chicken bone	Cure	Indirect	Cocaine 10%	L. Bronchus
27....	Male	32 years	18 days	Tooth plate	Cure	Jackson's	General	Bronchus
28....	Female	3 years	17 days	Tin whistle	Cure	Brenning's	General	Œsophagus
29....	Male	2½ years	2 days	Canadian cent	Cure	Brenning's	General	Œsophagus
30....	Male	2 years	7 days	Overcoat button	Cure	Brenning's	General	Œsophagus
31....	Male	9 years	29 days	Horseshoe nail	Cure	Brenning's	General	Bronchus
32....	Male	1½ years	4 days	Melon seed	Cure	Brenning's	General	Bronchus
33....	Female	12 years	3 days	Vulcanite button	Cure	Brennings'	General	Œsophagus

21 cases 5 years and under. Male, 21; Female, 12. Average age, 13½ years. Longest sojourn, 10 months; shortest, 4 hours. Cures, 32; death, 1. Instruments—Brenning's, 20; Jackson's, 11; Indirect, 2. Anæsthetics—General, 23; Local, 4; None, 6. Œsophagus, 21; Bronchi, 10; Larynx, 2.

indicates a main bronchus as the site of the offending body. 6. The final diagnosis is made by examination with the tube, followed immediately by removal of the offending substance.

Case No. 1. Female, age three years, admitted May 12th, 1920. Two and one-half weeks ago child was walking around with tin whistle in her mouth, suddenly gave a cry and threw back her head. She became red in the face, cried and began to vomit; this vomiting kept up at intervals for four days. She slept very well, and had no pain after half-a-day; she could drink, but could take no solid food. X-ray and fluoroscope show foreign body in the œsophagus at the level of the sternal notch. Œsophagoscopy at 4 p.m., under general anæsthesia. Bruning's medium-sized tube was used and a tin whistle found below the cricoid, grasped with alligator forceps and extracted. May 13th. Child's condition good; temperature normal; can swallow easily. Discharged, cured.



Case No. 1—Tin whistle removed from Œsophagus

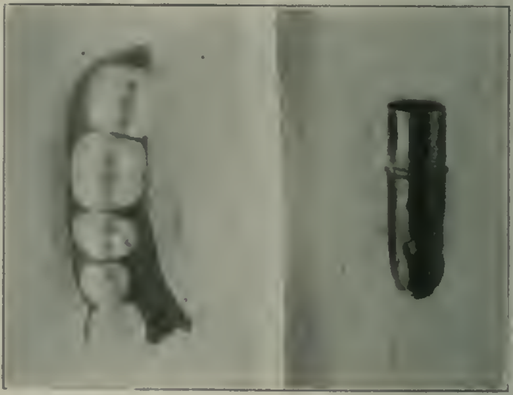
Case No. 2. Female, age two and a half years, admitted January 19th, 1917. Child was playing alone in the bedroom and came out coughing and choking, and coughed and choked until she was black in the face and vomited. After this she seemed much better and ate her tea as usual. Since then she has been listless and would not eat. The x-ray shows no foreign body, but left lung completely blocked and in a condition of atelectasis throughout. Bronchoscopy (without anæsthesia). Child's size speculum introduced; 5 mm. bronchoscope passed and speculum withdrawn; some yellow secretion seen presenting; bean discovered completely blocking the entrance to the left bronchus; grasped with larger forceps and partially withdrawn, but escaped in trachea and child had great difficulty in breathing for one or two minutes, and became very cyanosed. Bronchoscope reintroduced as quickly as possible, when bean sank to a lower position and cyanosis diminished. Considerable muco-purulent secretion came from the left main bronchus and escaped through the mouth. On the third attempt the bean was seen located over the bifurcation. Long strong forceps were introduced, and a good longitudinal hold was secured and the bean was slowly withdrawn along with the bronchoscope and safely delivered. The specimen secured was an ordinary bean much swollen, without envelope, and was entire. January 22nd patient was discharged in good condition.

Case No. 3. Male, admitted March 16th; died April 9th, 1916.

History. When lying on a lounge asleep, patient stated that he must have coughed and on taking a quick inspiration swallowed his upper set of teeth. He was seized with a choking sensation and had considerable pain. A doctor was called in who sent him to the hospital. The x-ray reported a foreign body as present, apparently at the bifurcation.

March 16th. Œsophagoscopy under cocaine anæsthesia. The foreign body was seen to be a tooth plate and was firmly lodged in the œsophagus about two inches below the cricoid cartilage. The body could be easily grasped with instruments but could not be dislodged.

March 17th. Œsophagoscopy under general anæsthesia. The foreign body could be seen and grasped, but could not be moved. The patient's condition was still good. He could swallow liquids fairly well, and was receiving liquids by the bowel.



Case No. 3—Tooth plate removed from bronchus   Case No. 5—Pencil case in left main bronchus

From March 22nd to 26th, inclusive, the temperature was normal.

March 27th. A third attempt at removal with the œsophagoscope was made, but failed. External œsophagotomy was done by a surgeon and the foreign body removed. This proved to be a tooth plate nearly two inches across and having two exposed hooks which were buried in the mucosa. It was not considered physically possible to remove such a body by the internal route, unless one had an instrument capable of cutting the body into two or more fragments and removing it piecemeal.

March 28th. The temperature shot up to 102·5°. The next day it reached 103·4°. This continued until April 9th. Patient went from bad to worse, becoming each day more septic, until he finally succumbed to pneumonia and general sepsis. The case presented a purely mechanical problem, and if this could have been solved the patient's life could have been saved. In spite of three operative attempts by mouth, the patient's condition remained good. When external œsophagotomy was done, he became rapidly septic and died. This would tend to bear out the statement of Jackson and others, that in external œsophagotomy the prognosis is extremely bad, although we must admit that the surgeon would have had a better chance had he had an opportunity of operating earlier in the case.

Case No. 4. Female, age two and a half years, admitted July 5th. About ten months ago, the child choked as though she had swallowed something; had been perfectly well before that. This choking lasted for about ten hours. She seemed to have a cough all that time, and she has had a wheezing ever since. For the last week it has been worse and she cannot sleep at night. Adenoids removed several days ago, but she has been worse since. At examination, sibilant and sonorous râles were heard on the right side of the chest; the pharynx was negative, the voice and cry quite clear. Bronchoscopy was advised.

July 5th. Bronchoscopy, no anæsthesia, unsuccessful. July 10th. Bronchoscopy, C. E. anæsthesia, unsuccessful. July 15th. Bronchoscopy, C. E. anæsthesia, successful. A melon seed was removed from the right bronchus. So long as the foreign body was in the lung the temperature was elevated, indicating some absorption. July 17th. Patient discharged, well.

Case No. 5. Male, age nine years, admitted June, 1918. Complaining of cough, pain in the chest and loss of weight.

History. Patient began to cough May 12th, 1918, after accidentally swallowing a pencil top made of brass or tin. The cough is spasmodic and mostly dry. Sometimes it is so severe as to cause vomiting and cyanosis. The pain is usually associated with the cough and is confined to the left side. He has lost thirty pounds in weight.

June 10th. *X*-ray shows foreign body in the left bronchus, and in the upper part of the left lung, opaque areas.

June 12th. *X*-ray shows foreign body in the same situation and a lack of air in the left lung. The foreign body is probably blocking up the opening of the left bronchus.

June 14th. Sputum examined—no tubercle bacilli found.

June 14th. Œsophagoscopy under general anæsthesia failed to locate the foreign body.

June 16th. Leucocytosis, 42,000.

June 17th. The second attempt under general anæsthesia failed, Jackson's 5 mm. bronchoscope being used.

Fluoroscope showed foreign body low down in the lung. The foreign body was seen and grasped but failed to be delivered. A considerable amount of muco-pus was aspirated from the lung. The patient's condition was better for the next twenty-four hours.

June 18th. Child developed, about 2.30 p.m., a very severe fit of coughing and cyanosis.

3.15 p.m. Fluoroscope showed foreign body to have changed position and to be now resting at the mouth of the right bronchus. This change of position probably occurred during the fit of cyanosis.

4.00 p.m. A low tracheotomy was performed. The foreign body was removed and found to be a pencil cover.

Recovery was uneventful. Discharged July 1st.

Case No. 6. Female, age forty-three, admitted February 19th. One month ago patient thought she had swallowed her teeth, while sleeping. The next morning she noticed that she had some difficulty in breathing. She consulted a physician the night after the accident, and was told that it was a physical impossibility for the tooth plate to go into the wind pipe. The cough persisted, and she felt a sensation in the chest as of indigestion. An *x*-ray was taken one week ago which showed the plate in the left bronchus. *X*-ray taken a week later confirmed the findings. On admission, the symptoms were very slight, consisting only of a little cough and expectoration.

February 20th. Œsopahgoscopy under ether anæsthesia. Jackson's large laryngoscope inserted and the 7 mm. Jackson bronchoscope passed without difficulty after slight cocainization of the larynx. It was passed into the left main bronchus and the foreign body was located in the exact position shown by the *x*-ray. The plate consisted of two teeth and a metal pin situated crosswise in the lumen of the tube, the pin was buried in the membrane of one side, the teeth in that of the opposite side. Attempts at removal were unsuccessful.

February 21st. *X*-ray shows foreign body in bronchus about one inch lower down than was shown in the first picture or about three costal from the diaphragm. Fluoroscope shows the foreign body moving up and down with respiration.

February 22nd. Bronchoscopy, 7 mm. bronchoscope introduced without difficulty and foreign body found in the left lower bronchus pretty well embedded in fibrin. This was removed and body exposed. Relative position was the same as before. Attempt to turn by a mechanical hook proved a failure. At this point a 9 mm. bronchoscope was passed. The pin was grasped with large forceps-bronchoscope, forced over to right and freed. Instrument and foreign body were then brought up together.

February 23rd. Condition good; patient walking around; temperature 99.4°, voice clear; considerable expectoration.

February 24th and 25th. The expectoration is in large quantity and purulent.

March 4th. Discharged, cured.

Case No. 7. Male, age sixteen months, admitted March 1st. Thirteen days ago the child picked up a screw nail and started to swallow it. On feeling pain in the throat, gave a cry and inhaled it. Had a violent fit of coughing, followed by vomiting. The child was taken to a doctor's office, where an *x*-ray was taken. This was interpreted as showing a nail in the œsophagus.

On February 28th another *x*-ray was taken, which showed the foreign body in the left bronchus.

March 1st. On admission, temperature was 102·1°. Child did not sleep well. There was a cough and expectoration. *X*-ray showed foreign body in the left bronchus about one-half inch below bifurcation.

March 2nd. Bronchoscopy, under anæsthesia; 5 mm. bronchoscope used. A screw nail was located in the left main bronchus at the point shown by the *x*-ray. This was removed by means of forceps. Discharged March 4th, in good condition.

In conclusion let me say that I regard bronchoscopy as a specialty within a specialty. This is a very exacting line of work, success in which requires the exercise of very special qualities on the part of the operator. The first of these is patience. Jackson emphasizes this repeatedly and advocates the practice of gentleness combined with mechanical ingenuity, rather than the use of too much force which in difficult cases is always a temptation.

The chief problem undoubtedly confronting the beginner is that of securing sufficient opportunity to acquire knowledge and experience. A thorough study of the anatomy of the subject, of the instruments used, and the method of using them is indispensable. Of great importance is previous practice on the cadaver, and the use of the mannikin; also the opportunity of assisting a competent operator in previous operations.

I may also mention the necessity of close supervision and personal inspection of apparatus by the operator himself previous to operation. It is very disconcerting to be compelled to stop in the middle of an operation on account of a defective light or to adjust a forceps which is not working properly.

Last, but not least, I wish to refer to the practice which I shall call "The massing of work". Even in a large city it is highly desirable that this line of work be done by one man. These cases are not numerous, and it is much better and more expedient from the standpoint of the patient that this should obtain.

DISEASES OF ETHMOIDAL AND SPHENOIDAL SINUSES

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Classification of Disease

1. Acute catarrhal inflammation.
2. Acute suppurative inflammation.
3. Chronic catarrhal inflammation.
4. Chronic suppurative inflammation.
5. Hyperplastic inflammation.
   (*a*) Hyperesthetic rhinitis type. (*b*) Type of nasal obstruction by polypi, often recurrent. (*c*) Type of disturbed function in the adjacent nerves.
6. Atrophic inflammation.
7. Tuberculous inflammation.
8. Luetic inflammation.
9. Mucocœle and pyocœle.
10. Neoplasma.

1. *Acute catarrhal inflammation.* This is quite common and usually is associated with a general rhinitis. The entire nasal mucosa is œdematous and congested. The secretion is serous and spreads over the mucosa of turbinates and meati and is expelled from the nose in large amounts from both anterior and posterior nares. Symptoms are a sense of fulness and heaviness often localized between the eyes. If there occurs obstruction to drainage from the ethmoidal cells with resultant distension, there is pain between the eyes which often radiates to the temporal or parietal areas. If there occurs obstruction to drainage from the sphenoidal sinus, there is usually dull occipital pain and often eye disturbances on the affected side.

2. *Acute suppurative inflammation.* This is an exaggerated stage of 1, and usually signified poor drainage. Pus appears in the middle and superior meati. The pain as described above is often severe. If obstruction to ethmoidal drainage occurs, an abscess may point externally just above or below the inner canthus or internally into the orbit. It is well known that each attack of suppurative inflammation in an accessory nasal sinus, although apparently healed, permanently lowers the resistance of that sinus to subsequent similar infection.

3. *Chronic catarrhal inflammation.* This is a rather common disease. In this class belongs a large percentage of the cases coming in because of so-called "catarrh" or post-nasal droppings. This commonly follows and is interrupted by frequent attacks of acute inflammation.

The diagnosis is often difficult. After the patient has been up a few hours and has blown the nose several times, there is often little to be seen except, perhaps, pallor and slight glazing of the mucosa of the middle turbinate, superior and middle meati. However, if the patient can be seen early in the morning, being careful not to blow the nose, the dried secretion can usually be seen at its point of emergence into the nose.

The symptoms of this disease are marked. The patient blows much mucus from the nose and draws it into the throat. The pharynx becomes dry and there is much hawking and spitting. Laryngitis or asthmatic attacks are common, as are also eustachian tube disorders. The nasal mucosa is irritable and frequently becomes congested, interfering with normal nasal breathing. In sensitive individuals neurasthenia is common. The mucous membrane of the lateral nasal wall is moderately thickened, pale and sometimes slightly œdematous. If cells are opened the mucosa is pale and covered with thin grayish mucus. There is no pain with this disease and no crusting or odor. Both ethmoids and sphenoid are usually involved. The general health remains good.

4. *Chronic suppurative inflammation.* All the positive signs and symptoms enumerated under 3 are present, plus the following: There is pus in the superior and middle meati. Attacks of pain are common and often severe. The discharge may become foul, and crusting is common. Neuritis, rheumatism or other effects of focal infection are frequent. The general health often suffers. Frequently the anterior ethmoids only, or the posterior ethmoids plus the sphenoid are involved, or the sphenoid may be involved alone.

Read before section on Eye, Ear, Nose and Throat, Canadian Medical Association, Vancouver, B.C., June 24th, 1920.

The mucous membrane over which the pus flows shows a distinct atrophy and obstruction to nasal breathing is uncommon. Microscopically, where the pus comes in contact with the mucosa there is a change from ciliated columnar epithelium into squamous cell type; there is marked round cell infiltration and the glands are primarily atrophied.

In this disease there are quiescent periods, with but little discharge and often no headache, broken by exacerbations of profuse discharge, marked headache and often prostration. These exacerbations usually follow a coryza.

5. *Hyperplastic inflammation.* In 1909 Uffenorde published his work on the ethmoid, and laid particular emphasis on the hyperplastic type; that is, of polypoid degeneration and polyp formation. Previous to that time polyps arising from the ethmoidal region were considered as due to a sinusitis, usually purulent. Uffenorde's idea, that polyp formation in the region of the ethmoid was due to hyperplastic disease of the ethmoid, met with severe opposition, but is now generally accepted. The present day belief is, that this condition is dependent upon a prolonged disturbance in the nutrition of the tissues of the ethmoid and sphenoid. Probably frequently recurring attacks of coryza, with resultant waves of advancing and subsiding inflammation and consequent damage of the mucosa, are a common cause.

It would seem that a mucosa which is very sensitive to irritation (such as is seen in hay-fever patients) would be especially prone to this disease. It is also well known that once polypoid degeneration occurs within the nose it is apt to spread rapidly and to involve neighbouring structures. Within this class of hyperplastic inflammation several clinical types are found:

(*a*) *Hyperesthetic rhinitis type.* There is a history of frequent head colds and attacks simulating hay-fever that come on at any time of the year. With these attacks there is much sneezing, watery discharge from the nose and obstruction to nasal breathing.

There is marked congestion and œdema of the entire nasal mucosa with much watery secretion. The external nares and upper lip are often excoriated and eczematous. After shrinking with cocaine-adrenalin solution the only abnomality observable may be a failure of some portion of the mucosa covering the ethmoid to blanch. Slight pressure here with an applicator may break through the thinned bony wall of a cell. Or there may be observed small polypi along the lower border of the middle turbinate or in the middle or superior meati. Polypi are often found within the ethmoidal cells.

(*b*) *Type of nasal obstruction by polypi, often recurrent.* There is a history of frequent removal of polypi from the nose with a new crop quickly growing out. Usually there is considerable thin discharge from the nose. Examination shows large or small polypi growing from the ethmoidal region. The ethmoidal cells contain polypi. These cases are easy to diagnose.

(*c*) *Type of disturbed function in the adjacent nerves.* Dr. Greenfield Sluder has made an extensive study of hyperplastic inflammation, especially in regard to the sphenoidal sinus. He emphasizes three factors which may have an influence on the nerves in contact with the bony wall of this sinus. (1) Extension of the products of inflammation (toxins) through the thin bony wall; (2) direct extension of hyperplastic inflammation to the soft tissue lining the bony canals or fissures through which these nerves pass; (3) actual change in the bony walls of these canals or fissures, causing diminution in the lumina of same. Regarding this last-named factor, he has observed and recorded the actual change in size occurring in measurable canals, such as the outlet of operated frontal sinus cases, where complicated by this disease. He has found these to grow smaller in the period of a few years.

The three nerves which pass through bony canals in close relation to the sphenoidal sinus are especially apt to be affected. These are the optic, the maxillary and the vidian. The oculomotor or ophthalmic nerves may become involved in the sphenoidal fissure, or the abducens may be in contact with a large sinus extending to the dorsum sellæ. These observations with case reports are found in Dr. Sluder's work on hyperplastic sphenoiditis.

Pathology of hyperplastic inflammation. Early there is hyperæmia with outflowing of serum into the interstitial spaces of the connective tissue. If mild, the process stops here. If the process advances, the infiltration of serous elements becomes greater, and by force of gravity a mucous polyp soon forms. This process later attacks the bony elements. There may at first be actual bone hyperplasia, but later there occurs thinning and softening of cellular walls.

Microscopically, the external epithelium shows round cell and leucocytic infiltration before polyp formation occurs. In the polypoid areas the ciliated epithelium changes to squamous. There is marked connective tissue formation beneath the basement membrane and this becomes filled with serous exudate. The mucous glands are hypertrophied, often with cystic dilation of acini. The blood vasa atrophy, the periosteum is hypertrophied. Along the bone are found bone cells, some osteoblasts and some osteoclasts, but in severe cases the osteoclasts always predominate.

6. *Atrophic inflammation.* This disease of ethmoidal and sphenoidal sinuses is found as part of a general atrophic rhinitis. The frequent association of atrophic rhinitis and chronic suppurative accessory sinus disease is noteworthy. The question arises as to which is primary. Especially must this be kept in mind, as it is well known that microscopically and grossly there occurs an atrophy of nasal mucosa when kept long in contact with purulent secretion. This possibility of atrophic rhinitis following chronic suppurative sinus disease adds weight to the indication for curing the suppurative process.

7. *Tuberculous inflammation.* This is a very rare disease. Lockard, in "Tuberculosis of Nose and Throat," 1909, was able to collect from the literature the report of only two cases. The process leads to extensive destruction of tissue with resultant ulcerations and fistulæ. These lesions have the characteristic appearance of such lesions elsewhere. The prognosis is bad.

8. *Luetic inflammation.* This class of ethmoiditis and sphenoiditis may start as a simple acute inflammation, but later always becomes purulent. It is usually a tertiary manifestation. Cases have been reported with extensive bony necrosis, but the usual case cannot be differentiated locally from the chronic suppurations of other ætiology. Therefore, every case of chronic suppurative sinusitis should have a blood Wassermann test to rule out lues as a causative factor.

9. *Mucocœle and pyocœle* of anterior or posterior ethmoidal cells may occur, but is much more frequent in the anterior cells. Mucocœle here, as elsewhere, is due to a closure of the ostia, usually by hyperplastic inflammation, and leads to a distension of the cavity or cavities by mucoid material, which is secreted by the glands of the lining mucosa. This gradually increasing tension is accompanied by a reabsorption of bone and there occurs distention of the bony walls. Externally a swelling appears at the internal portion of the orbit which gradually dislocates the eyeball outward and downward. Intra-nasally the anterior ethmoidal capsule bulges toward the septum. These swellings are smooth, rounded and elastic, giving a sense of fluctuation. The process is painless except that there may be pain in the eye from pressure. The content is a thick mucoid material, varying in color from yellowish to green, and is sterile.

Mucocœle of the sphenoidal sinus seemingly does not occur. An infected mucocœle becomes a pyocœle. There occurs locally redness, local heat, tenderness and severe throbbing pain.

10. *Neoplasms.* New growths are not common in this region. Of those occurring, carcinoma is the most frequent. Sarcoma also occurs. Both are friable and very vascular. They soon slough and lead to extensive tissue destruction. It has been demonstrated that most of the nasopharyngeal fibromata arise from the interior wall and lower anterior wall of the sphenoid bone.

Remarks. The above classification has seemed to the writer to give a useful basis for the grouping of clinical cases. It is appreciated, however, that chronic catarrhal inflammation would pathologically be classed as the simplest form of hyperplastic inflammation. Also there occurs hyperplastic inflammation complicated by suppuration. Consensus of opinion is, that hyperplastic inflammation is primary and that suppuration is due to secondary infection. Therefore, these cases have not been given a separate classification.

Diagnosis. A carefully taken history is important. One should determine all the symptoms both past and present noted by patient. This is very essential in order to give the case the proper clinical classification.

As to the condition obtaining in the ethmoid and sphenoid at the time of examination, the writer feels that one must depend, above all else, upon the appearance of the visible portion of these structures. This is quite different from the other accessory nasal sinuses, namely, frontal and maxillary, where the final criterion of diagnosis is radiograph, or content of sinus as shown by irrigation. In examination of the ethmoid and sphenoid a portion of the middle turbinate and middle meatus may be observed by anterior rhinoscopy. Also, if a patient can properly control the throat, a view may be obtained of the posterior portion of the turbinates and meati by means of the postnasal mirror. As a routine measure with private cases this is, we believe, very much less efficient than the examination by the nosapharngoscope, for example the Holmes model. After applying a little cocaine solution along the floor of the nose one can easily observe all the detail of the posterior portion of the nose. This instrument focuses at about one inch, so that the region of the ostium sphenoidalis is seen in normal dimension, while objects nearer than one inch, for instance, tips of inferior turbinates, are much magnified. One can easily determine the color of the mucosa or the presence of dilated and tortuous blood vasa so common in chronic inflammations.

The ease of examination by this method is in marked contrast to the difficulty of the postnasal mirror. Often the diagnosis is simplified by having the patient come in early in the morning, having been instructed not in any way to blow or clean the nose. A lateral x-ray will show any cloudiness present and will give the sagittal relations of the sphenoidal sinuses. As a routine test, a blood Wassermann in all cases of chronic suppurative sinusitis may save the physician much chagrin.

If tuberculosis is suspected, tissue examination, search for tubercle bacilli, or guinea pig injection should be made. If neoplasm is suspected, tissue examination is indicated.

Treatment. In all acute diseases of the ethmoid and sphenoid the treatment should be palliative. By this we mean constitutional treatment, soothing and astringent sprays, breathing of medicated vapours, etc. If an acute ethmoidal abscess forms, it must be incised; but if an exenteration of cells is indicated, this should be postponed until the acute condition has subsided.

The treatment of chronic catarrhal inflammation must be worked out for each case. Some cases improve on liquid iodex spray (iodine in oil). Some seem benefitted by alkaline nasal douches. Vaccine treatment offers possibilities. Some patients find such a discharge very annoying and distasteful and these cases should be operated on. Chronic suppurative inflammation requires operative treatment. If limited to the anterior or posterior cells, these alone should be removed.

The treatment of hyperplastic ethmoiditis and sphenoiditis also must be worked out for each case. If polypi are present with no symptom except obstruction, removal of polypi may bring relief. However, this type of inflammation, if accompanied by profuse discharge, symptoms of hyperesthetic rhinitis or symptoms of nerve disturbance, indicates operation.

Tuberculosis inflammation had probably best be treated by general hygienic measures. If these cases are operated on, they quickly recur and with increased virulence.

Mucocœle and pyocœle require removal, including the lining membrane.

Carcinomata and sarcomata indicate wide removal, but by the time diagnosis is made, many of these cases are inoperable. Radium therapy should be used in pre- and post-operative cases.

Note.—We have said that all cases of chronic suppurative inflammation and some of hyperplastic and chronic catarrhal inflammation require operation. By this we mean exenteration of the ethmoidal cells as far as possible, and removal of the anterior wall of the sphenoid.

Operative Technique. In 1882, Zuckerkandl gave the normal and pathological anatomy of the accessory nasal sinuses and established the usual relation of the sphenoidal sinus to the optic nerve. Schæffer, in 1885, was the first to open the sphenoid. He and his followers enlarged the natural opening. Killian, in 1900, called attention to the frequent coincident involvement of the posterior ethmoids, and to the possibility of opening the sphenoid through the pars ethmoidalis. Hajek demonstrated that the best results were obtained by resecting both pars nasalis and pars ethmoidalis. It is interesting to note that important surgical anatomy of the sphenoid is only thirty-eight years old and the operative procedure only thirty-five years old.

The exenteration of the ethmoidal labyrinth is done by many methods and with many different types of instruments. The method described below is one which at present seems best suited to the writer's needs. Local anæsthesia with the patient in sitting posture is preferred. General anæsthesia makes the work quite difficult, because the vasa are congested, giving rise to brisk bleeding and consequent obscuring of the operative field. With local anæsthesia and the patient in the sitting posture there is usually enough shock that the operative field is almost free from blood. No preliminary sedative is used. Cocaine solution 20 per cent. with one-third the amount of adrenalin chloride solution, is applied to the nasal aspect of the ethnoid and sphenoid by means of a small cotton applicator. Especial care is taken to apply this to the two points of emergence of the nasal sensory nerves. This is repeated every four minutes up to four applications. Operation is not begun until twenty-five minutes after anæsthesia is started. It is very important to note beforehand, whether the nasal septum will allow space for proper inspection and for manipulation of instruments. If the septum anteriorly deviates markedly to one side, it is a most conservative measure to do a preliminary submucous resection.

Polypi, if present, are removed by Knight's or other similar forceps. The middle turbinate is removed by Ballenger's knife or by nasal scissors and Knight's forceps. The bulla ethmoidalis is entered by a curette, and, working forward and backward from this, keeping the field always clearly in view, and frequently using the probe, the cells are exenterated one by one, much as one does a mastoid operation. The author has devised a curette with bayonet-shaped handle which allows at all times a view of the operative field. The superior mesial wall is left standing, until all the upper ethmoidal cells have been removed. This guards against damaging the cribriform plate. The lamina papyracea can usually be easily detected by its smoothness and hardness. However, great gentleness and care must be used in the superior posterior portion of this, as perforation here is extremely easy and dangerous. This method is not spectacular or speedy, but has factors for safety which recommend it.

If the posterior ethmoids have been removed, thus exposing the sphenoidal face, the ostium can usually be found. This may be enlarged by Faraci forceps or Sluder's hook knife. If the ostium is not easily found, the sphenoidal face may be penetrated in the upper portion by Sluder's knife and this opening enlarged by the same knife and biting forceps. With suitable biting forceps (Faraci, Hajek or Dentlenk) the anterior wall of the sphenoid can be removed down to where the shelving edge of the sphenoidal floor meets the anterior wall. This is too thick for any knife, and the shelving conformation together with its thickness makes it impossible of removal by any biting forceps. Dr. R. C. Plummer remarked the ease with which Halle removed this portion of the anterior sphenoidal wall by means of electrically driven burrs. This led to my idea of hand burrs and rasps with angular handles. These have proved very satisfactory, for with them the anterior wall may be removed flush with the floor. This gives excellent drainage and makes the post-operative care of sphenoidal cases almost nil.

If after exposure of the sphenoidal face, the ostium cannot be found and there occurs difficulty in penetrating the anterior wall, the writer deems it proper to stop the operation at this point. Then, after healing of the posterior ethmoidal area occurs, and with a dry unobstructed field, the removal of the anterior sphenoidal wali can be done with ease and safety; whereas at the time of the first operation, hæmorrhage, or possible disorientation might introduce an element of danger.

At time of opening the sphenoidal sinus a culture is taken, but absolutely nothing is done to the lining mucosa. We know that the lining of this sinus rarely shows marked pathological change, and that if given proper drainage it shows great recuperative powers. Also there have been reported congenital debiscenses of lateral sphenoidal wall which would leave the cavernous sinus unprotected by bony tissue. This should instil into the operator's mind a profound respect for the mucosal lining of the sphenoid.

Here may be mentioned the method of opening the sphenoidal sinuses via the nasal septum without removal of the middle turbinates or posterior ethmoids. The operation is begun as an ordinary submucous resection of the nasal septum. The resection is carried posteriorly to where the perpendicular plate of ethmoid joins the sphenoid crest. This crest is bitten off with strong forceps and both sphenoidal sinuses thus entered. Then by working between the layers of the septum, also through the usual nasal passages, the pars nasalis of the anterior sphenoidal wall of both sinuses can be removed. A long thin-bladed Killian speculum is useful. This is a conservative operation, where there is indication for opening the sphenoidal sinuses, with no accompanying disease of the ethmoids. The writer has followed the above technique several times upon the cadaver, and has encountered no especial difficulty, but has not attempted it upon the living patient.

In any operation on the ethmoidal or sphenoidal sinuses no packing is placed within the nose, unless the amount of post-operative bleeding demands it. The patient is put to bed in the sitting posture until sleeping time, when he is allowed to lie on the side or on the abdomen with the face so placed that the blood will gravitate out of the anterior nares. If continued hæmorrhage occurs, a Stephenson intranasal tampon (3 x 0·5 inch) is introduced along each nasal floor. This is removed within four to eight hours.

The external operation on the ethmoidal and sphenoidal sinuses will not be discussed in this paper.

Post-operative Care—Results. The patient is given a bland oil for nasal spray and is cautioned against forcibly blowing the nose. At intervals of four to seven days the nasal tissues are shrunken with cocaine adrenalin solution and silver nitrate solution is applied to the granulating areas, especially to the edges of the opening into the sphenoidal sinus. This must be continued until healing is complete.

In chronic catarrhal and in hyperplastic inflammation the complete spheno-ethmoidal operation usually results in a cure. The mucosa takes on a normal color, and there is no excessive secretion, also the neuralgias associated with the hyperplastic process usually abate. In chronic suppurative inflammation, even though a very thorough operation is done, there usually remains some excessive discharge. Even with this, the general health often improves greatly and symptoms of focal infection disappear. If in any type of chronic inflammation the sense of smell has been lost, it usually returns. The nose and throat do not become dry afterward. On the contrary a pharyngitis sicca usually disappears.

It is well known that, if any accessory nasal sinus becomes infected, the resistance of that sinus is permanently lowered and becomes lower with each reinfection. Thus we note that the operated spheno-ethmoidal cases, although cured, show with each coryza an acute reinfection often with return of the old symptoms. These infections are treated by applications of weak silver nitrate solutions and they quickly subside.

Remarks. This paper presents nothing new. Material has been borrowed from any available source and as far as possible credit has been given the original author. If in some instances this has not been done, we beg leniency.

A special technique is now being used for taking cultures from the sphenoidal sinus. A metal tube about 5 mm. in diameter is placed so that the lower edge is directly over a portion of the sphenoidal opening. A sterile applicator can then be passed along the bottom of this tube directly into the sinus without contamination from the general nasal mucosa.

The chronic inflammations of the ethmoidal and sphenoidal sinuses have furnished a large quota of little understood and hence greatly mistreated cases. The sphenoidal inflammations accompanied by severe headache have often been classed as migraine or simple headache and mistreated as such. Legions of these patients with chronic post-nasal discharge have been consigned to the semi-hopeless diagnosis of "catarrh".

These cases deserve our best endeavours. They are often difficult to diagnose, and even after diagnosis, difficult to cure. Many of these cases lead a wretched existence because of foul nasal discharge, constant hawking and spitting, septic absorption, referred pain, etc. Therefore, we believe justifiable any effort to correlate our knowledge on the subject, or to record accurately the treatment given and results obtained in this difficult group of cases.

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NON-UNION FOLLOWING FRACTURE

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THE first consideration in a discussion of non-union following fracture, is the definition of the term. It is used here to designate those cases that fail to effect a rigid bony union. Some cases develop a dense fibrous union, and if it be in a bone that does not have the stress of weight bearing, it produces very little disability, and will therefore not require interference. Fibrous unions that are dense are frequently very difficult to diagnose. They may be so strong that no flexibility of the limb may be elicited. *X*-ray may not demonstrate the lack of bony continuity, yet if the patient puts stress on the part, he complains of pain. This pain may render the part more than 50 per cent. disabled. Most cases of non-union are, however, easily recognizable, and the condition obvious.

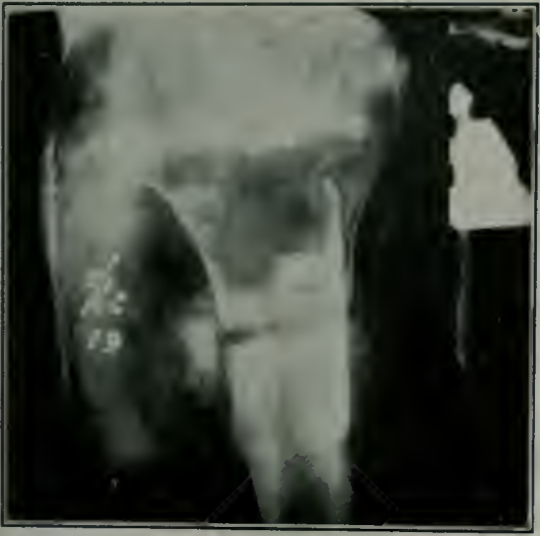

Fig. 1.—Graft from Tibia and plate of bone, and three screws of bone as internal splint. Leg is in plaster.

The dense fibrous unions in weight bearing bones require interference because that fibrous union never becomes bony. Union after fracture occurs by virtue of the proliferating of obsteoblasts from the open haversian and other channels. Blood vessels proliferate, and with these capillary buds osteoblasts extend. In this manner a granulation tissue is built up. If sufficient osteoblasts appear, and meet from either fractured end, bony union results, but if proliferation of fixed connective tissue cells outgrows the osteoblasts, then the ends of the bones and their new-formed bone are divided by a wall impermeable to osteoblasts.

If this, then, is the process of formation of new bone, a fracture should unite, if closely coapted, and no infection occurs within a certain time. Experience teaches us that this time is three or four months. A bone that has suffered a simple fracture and is ununited at the end of four months may develop a denser, more fibrous union, but it will never develop, if left to itself, a bony union.

Non-union in weight bearing bones demands interference, and should in every case either have a graft inserted or a mortis effected.

The underlying principles of bone proliferation and growth upon which this work is based are elsewhere described.[1] For the purpose of this discussion it may be stated that a bone transplant has no inherent value as a nidus from which bone will develop. It is, from a practical view-point,

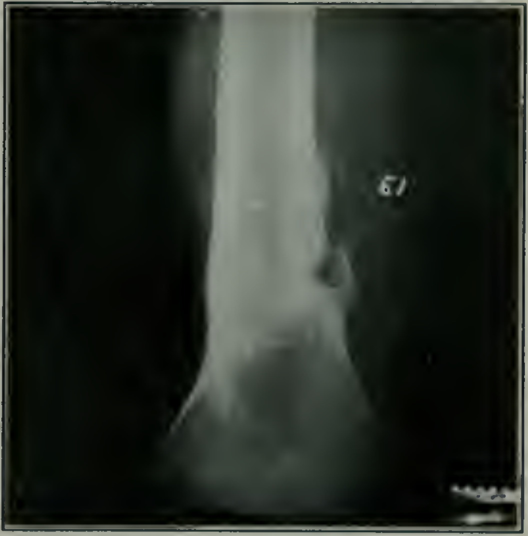

Fig. 2.—Showing union. Plate and Graft almost disappeared. *X*-Ray taken six months after Fig. 1.

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a simple scaffold through which bone will grow, and as it grows, absorb what it replaces.

The principle for the surgeon in bone-grafting is simple. It is essential that there be a wide expanse of raw viable bone intimately and securely opposed to a wide expanse of transplant. If this be attained, revascularization and regeneratiom of the graft is rapidly accomplished. In mortising, one opposes living fragment to living fragment and union occurs early.

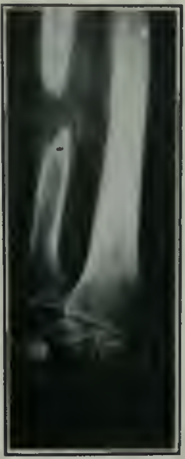

Fig. 3.—A Non-union of Ulna.

Technique of bone-grafting, and the choice of operation, varies with the bone to be treated. The femur and humerus present problems different from those of the radius and ulna. The femur and humerus do not always lend themselves to grafting. If there be little loss of bone tissue, it is preferable to mortise the bones, and by producing a stronger union, to compensate for a little shortening. One point is certain, and it is that one should not attempt to fill a defect in the femur or humerus by the application of a transplant, having in view the preservation of equal length of the limbs. It is impossible to procure a graft sufficiently large to bear the carrying stress required in these large bones, and it is futile to expect a transplant to "grow" to the size of its host. It will, if treated gently after union has occurred, increase in density and girth and strength, as any other bone would with increased work, but if the attempt of preserving length is made in the femur of humerus, the graft will almost invariably be broken if the limb is used by the individual. If the humerus or femur is already short, a graft may be employed, but the ends of the fragments must be squared off so that union may occur between these raw ends, and in this way assist the transplant when stress comes.

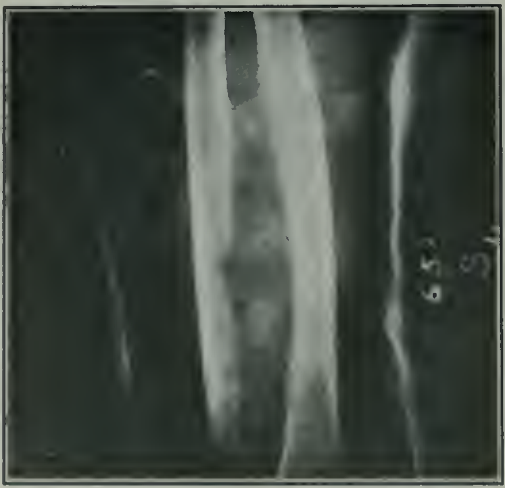

Fig. 4.—Same case as Fig. 3, after a "diamond" graft.

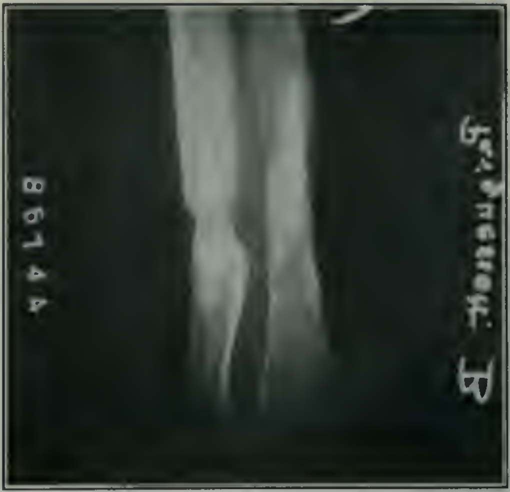

Fig. 5.—Bone graft for non-union of Radius and Ulna. Both grafts were autogenous, but the one in the right (Radius) was boiled.

A mortising operation is performed by making

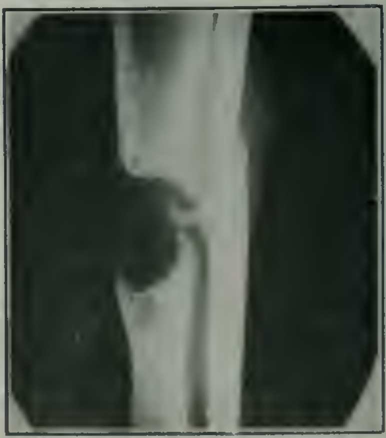

Fig. 6.—Non-union with loss of tissue in Tibia.

one fragment a spear head and the other a cleft. The spear head should be quite long, and fit exactly the cleft in the other fragment. When these are so shaped that the raw bone is intimately associated with raw bone, it is essential to hold them immobile. This is readily obtained by the use of screws of bone and plates of bone, as described elsewhere.[2] Kangaroo tendon or wire does not hold the union immobile.

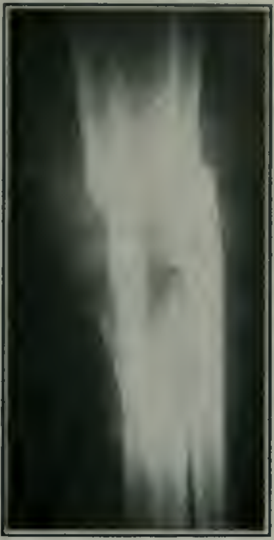

Fig 7.—Same case as Fig. 6, with graft inserted.

A graft of these long bones is done as above noted, and the union is held with plate of bone and screws of bone (Figs. 1 and 2). The graft employed should be slightly larger than the bed prepared for its reception. It is then possible to wedge it tightly, and this in itself may be all the internal fixation required. No closure of the wound should be made until the operator assures himself that there is absolute immobility in the union.

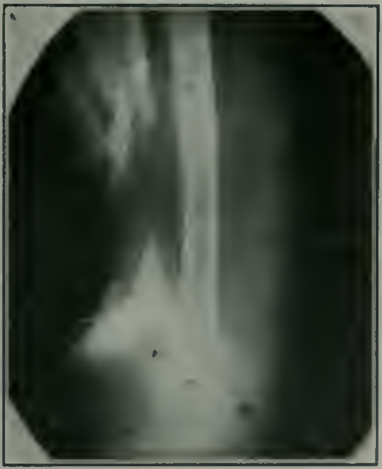

Fig. 8.—Non-union of Tibia with short Upper Fragment.

Non-unions of the radius or ulna or tibia present easier problems. Here long defects may be bridged by transplants, as in each case there is one companion bone to assist in weight-bearing.

The method of choice in these bones is the one where the fragments, having been shelled out of their periostial bed, and alignment corrected, a saw-cut is made along the desired plane in each fragment. An osteotome introduced into the saw-cut at the end of the fragment is driven longitudinally along the saw-cut and the fragment is split as one would split a stick. This split opens up the bone from the sclerosed ends for a distance of two or three inches, and permits of good viable bone being obtained for contact with transplant. The distance from the end of the split in one fragment to the end of the split in the other fragment is carefully measured. This is the length of graft required. The width required is also measured and the graft cut from the flat surface of the tibia after the periosteum has been reflected. The dimensions of the graft are then outlined on the tibia by a chisel. The graft is diamond-shaped, wide at its middle and tapers from the mid-point to the end. This graft is grasped at its middle in the teeth of a pair of lion-jawed forceps and one end is driven into one split, which widens out to receive it. The other end of the graft is side-slipped into the other fragment. If the graft has been accurately cut, no further internal fixation is required, as one can readily

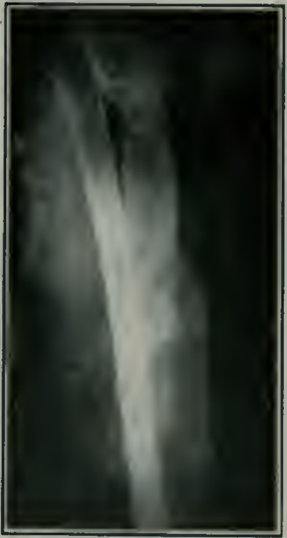

Fig. 9.—Same case as Fig. 8. Graft in position.

demonstrate by picking the limb up at its extremity and noting the immobility at site of operation. The wound is then closed. The virtue of the diamond type of graft is that there is such an excellent exposure of bone on both sides of both ends of the transplant, and if the fixation has been efficient, union is certain to occur.

Infection frequently occurs in this type of surgery in military cases. Here infection has been repeatedly demonstrated in scar tissue that is blanched and cool, and has been so for six months or longer. Even with infection present, union may occur. In this case the infection is a great cause of bone proliferation *vide* osteomyelitis. The graft keeps up the infection, and a union may occur if there has not been too long a gap to be bridged. This new-formed bone must come from the ends of the fragments, as no one could conceive that a transplant lying in a bed of pus could be viable. The graft is slowly eroded by the pus, and after months may be removed, looking very much like a sequestrum.

The external splint used has been plaster of Paris. This has been left on for a period of three months. The cast has then been removed, and if the case was one in which a loss of tissue had made necessary a long graft, further splinting for one or two months was effected.

If infection is going to occur, it usually shows symptoms within thirty hours, giving increase in temperature, pain, and throbbing in the wound. There have been cases, however, where all has been quiet for six weeks after operation, and then infection has begun.

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Professors Devote Earnings to Medical Research—Half a million dollars earned during the war as the result of a medical discovery has been presented to the Dermatological Research Laboratories or support of medical research. The donors are Doctors Jay Frank Schamberg and John A. Kolmer, and Professor George M. Raiseiss, all of the University of Pennsylvania faculty. The donation consists of $373,000 cash and more than $125,000 in equipment, and represents the profits made by sale during the war of the drug arsophenamine, a United States development of the German drug salvarsan.

AN ANALYSIS OF SOME CASES OF PERFORATION OF THE STOMACH AND DUODENUM

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THE following paper represents an endeavour to analyze a series of twenty-two cases of acute perforation of the stomach and duodenum. Fifteen of these have occurred in my own practice in the last twelve years or so, and seven have been collected from the experience of some of my colleagues; a more detailed account of these cases has been given in a paper read before the Academy of Medicine, in Ottawa, in March of last year, and for this reason my analysis will be short and without much detail.

It was found that although ulcers of the stomach and duodenum are comparatively common (at least ulcers diagnosed and treated as such by the physician in conjunction with the report of the *x*-ray specialist), yet the cases in which an acute perforation of such ulcers takes place, are actually very rare, and when this complication occurs it is a decidedly grave and frequently fatal accident.

The onset of the perforation is accompanied by a sudden severe stabbing pain in the epigastrium, and all those symptoms which characterize shock and collapse, giving the picture of an acute abdominal crisis, and it might be said that in a fairly large percentage of the cases the diagnosis is only made after the abdomen is opened. Some surgeons state that in 36 per cent. of cases, the appendix is blamed for the trouble, and that the incision is made over McBurney's point in the exploration, in this series this error was made three times. The main difficulty lies in the choice of a surgeon. If he is experienced in abdominal surgery, he will be able to deal with the real condition as soon as he opens the abdomen, and inspects the region of the appendix. In one of my earlier cases, the appendix from its appearance, seemed to offer sufficient evidence of trouble and the patient, of course, died. Occasionally, on opening the abdomen, the appendix may be found not only abnormally situated, but congested and apparently inflamed, and if much handling of the bowel with dry gauze, etc., is indulged in, may well mislead the surgeon who lacks abdominal experience. This mistake should be avoided in the great majority of cases, if the surgeon sees the patient early. The onset of severe collapse and shock are out of all proportion to those symptoms seen in an ordinary perforated appendix, especially when the ulcer has perforated directly into the peritoneal cavity, the symptoms of a typical case of perforation are given in the following case.

A chauffeur, aged twenty-seven, was taken with a sudden severe tearing pain in the epigastrium accompanied by symptoms of great shock and collapse. The face was pale and anxious, beads of perspiration bathed the forehead, and there was a sensation of impending death. The temperature fell to a sub-normal level within a few hours, no vomiting occurred, pain in the right shoulder was intense. The abdomen was firmly distended, like a cannon ball, and diaphragmatic respiration was suppressed. The legs were drawn up and the patient feared being touched. There was absolutely no history of previous stomach trouble, and the whole affair was as sudden as unexpected.

A mistaken diagnosis of appendicitis may be easily made in the cases of perforation seen after many hours have elapsed; reaction may have taken place from the shock and collapse; morphia may have been given for the pain by the attending physician, and the patient may seem to be resting in a fairly easy condition. It is here that the most rapid and careful history must be obtained before the surgeon opens the abdomen.

In our series we further found some very startling conditions. In forty per cent. of the duodenal cases and in about 50 per cent. of the stomach cases, the onset was accompanied by severe stabbing pain in the shoulders going frequently right through to the tip of the scapula and lasting for a few minutes to many hours. In one case in particular, this gave the appearance of a rapidly developing pneumonia; it is hardly necessary to say that the chest should be carefully examined in these cases.

This sudden pain referred to the shoulders, of

Read before the Canadian Medical Association, Surgical Section, Vancouver, June meeting, 1920.

which by no means enough is said in the textbooks, is of extreme interest. The ring of the pylorus seems to be a dividing line, and, indeed, embryologically, it divides that part of the digestive tract which is to be the future stomach from the duodenum and the small intestines. If the perforation is to the left of this ring on the pylorus, then the left shoulder suffers; if to the right, the right shoulder. the right-sided distribution of gall bladder disease or perforation is familiar to all of us. In this connection, it may be stated that in the course of experimental work in radiology during the process of which oxygen is injected into the peritoneal cavity for the more perfect outlining of the viscera by their separation from each other, many of the patients complain of severe pain in the shoulders, and that the explanation given by the investigators is, that this pain is due to pressure exerted on the diaphragm by the oxygen, the escaping gas in an acute perforation of the stomach or duodenum probably acts in the same way. This symptom thus explained was not only present, but showed itself as a definite feature in a large percentage of cases, it was particularly noticeable in tho case of the chauffeur just referred to.

Vomiting, an all-important symptom, never failed to appear in my cases of perforations in gastric ulcers; in the duodenal cases, however, it occurred either once or not at all, and therefore it is not to be considered as a prominent symptom in perforation of the duodenum. The fixation of the diaphragm and abdominal wall already referred to, is usually absolute and definite. The term "cannon-ball rigidity" well describes the condition.

Perhaps the most puzzling question in all the duodenal cases was the remarkable absence of any reference to previous digestive trouble. In the stomach cases, however, careful enquiry usually revealed the fact that indications of some gastric disorder had long been present. Expecting confidently that patients, the victims of duodenal perforation, would relate to you a month-long or year-long history of indigestion and pain in the epigastrium, one is constantly surprised by the assurance of these patients that they have never suffered a day of illness or that they have always felt perfectly well, the absence of complaint in a large percentage of these cases, should be remembered by the surgeon, as it tends to draw away attention from a real condition in the duodenum. A typical case may be cited: Mr. B., age thirty-five, laborer, strong and vigorous, working regularly, had enjoyed a good breakfast, and had emptied a full dinner-pail at one o'clock. At 5 p.m. he was suddenly stricken with an acute abdominal condition (perforation of the duodenum) though assuring me seven hours later that he had remembered no sickness or gastro-intestinal upsetting at any time in his life. Answers such as these must be frequently listened for in the cases of duodenal perforation. It is little cause for wonder then that approximately thirty-six per cent. of these cases are mistaken for some other acute abdominal condition more especially for perforation of the appendix, as instanced in a recent series of fifty cases in the English *Lancet*.

Regarding these confusions, between two such conditions, it is interesting to note that in all probability pathological conditions in the appendix may often cause a spasm in the duodenum; an x-ray picture might reproduce this spasm and simulate ulcer and its constriction. If only one plate be taken, this might lead to a diagnosis of duodenal ulceration. It would be wise then, to make sure of one's ground with three or more plates, since one normal plate will be sufficient to warn against errors. Twice within the last two months, I have opened the abdomen looking for an ulcer of the duodenum, only to find that the trouble was due entirely to an aggravated appendix. The incision for opening the abdomen, I usually make in the right rectus close to the median line, though one does not question the exact locality, any median incision over the epigastrium is quite well over the area occupied by the expected ulcers. An area that may be covered by the palm of the hand and situated as regards the duodenum on the anterior part of the first portion on a level with the common bile duct, and as regards the stomach close to the pylorus on the anterior surface, but closer to the upper than the lower curvature.

Some of the ulcers found in the series, were clean-cut with little induration, about the diameter of a slate pencil. From these the stomach or duodenal contents might be escaping, others were so indurated that suture by ordinary means was impossible; others again were buried in a mass of adhesions. If these ulcers could be sutured, fine thread in double layer was always used, going wide of the ulcer to insure stoppage of the leak, care also being taken to take a deep bite of the tissues with the sutures. If the case is one where suture is impossible, the thickened cartilaginous-like tissue preventing the covering of the area, there will rarely be time to resect and perform a gastroenterostomy, the greater endeavour must be to stop the leakage and to close the abdomen as soon as possible; a delay even for a few minutes may mean the life of the patient. In such case (although it has not been necessary in the series) it would be sound surgery to pass a tube into the viscus to bring the subsequent discharge to the surface, and to pack around with gauze (as practiced in a few cases by Richardson) rather than to trust to an omental graft. In a perforation of the stomach close to the pylorus in a Mr. M., age fifty, the ulcer had become covered by a piece of omentum the size of a silver dollar, which though found partly attached and covered with inflammatory lymph, had evidently torn away under some sudden strain. Omentum is a splendid accessory to a weak suture line, but not safe as a means of permanent closure. The performance of gastro-enterostomy after closure of the perforation, is a question which depends on the condition of the patient and the patency of the pylorus. Gastroenterostomy after closure was performed twice in the series. I give a detail of one of the cases.

Mr. M., age sixty-one, perforation of an ulcer on the anterior wall of the stomach near the pylorus. He had been ill for three years with symptoms of indigestion. For the last month had suffered from an almost continuous vomiting, and had quickly fallen in weight to 99 pounds. An operation revealed pyloric obstruction with the acute perforation. A posterior gastro-enterostomy was done immediately after closure of the ulcer and the patient made an excellent recovery, weighing 175 pounds six months later, and to-day thirteen years after, he remains in the best of health.

With my limited experience it would seem reasonable to deduce that "if the pylorus is patent and the vomiting not continuous or persisting with the patient in a desperate condition after some hours of battling with an acute perforation, it would be the better part of wisdom to stop the leak, close the abdomen and return the patient to bed as quickly as possible, rather than to fritter away precious moments with a longer operation, which, at the time, cannot in the least contribute to his subsequent welfare." It may be mentioned here that before closing the abdomen, it is wise to be sure of their being only one perforation since two or more have been found at the same time, or have been known to occur within a few hours of each other. It is also wise to examine posterior wall of the stomach; this can be done by making an opening through the transverse mesocolon, as in the performance of a gastroenterostomy.

A vital question is the procedure in cases in which the stomach and duodenal contents are diffused through the abdominal cavity. To what extent should we practice irrigation of the abdomen? In this series the treatment (immediately suture was performed) consisted in mopping up as rapidly as possible with warm moist gauze pads, and, if the case had been seen early and the stomach found almost empty at the time, closing the abdomen without drainage because the upper digestive tract is comparatively sterile as regards its contents, particularly in those stomach cases which have been under treatment by a physician for a long period of time. In cases where, on opening the abdomen, the intestines are floating in fluids, tea, porridge, mucous and gastric secretions, the procedure should be to mop up as much as possible, and as quickly as possible, to put through-and-through sutures in the wound, and to place a tube in the pelvis. The patient should be placed in the Fowler position, and in order to lessen thirst one should give the saline drip by rectum, plenty of morphine should be used, as this drug is undoubtedly our best remedy in shock. In no case of this series was a transfusion of blood done, although this procedure undoubtedly has its value. Cases that died did so either from shock or from a general suppurative peritonitis. They ran a course of from three to thirty hours, and as a rule the longer the case had been perforated, the greater the mortality, particularly as concerned those which perforated into the general peritoneal cavity rather than posteriorly, or into adhesions. The percentage of recoveries was fifty-two, including those perforating either behind the stomach or into adhesions, there were seven of these two types. It is to be noted that the usual percentage of recovery of those cases which perforate into adhesions or behind the stomach is eighty-six. Inclusive evidence of the greater danger to life of the acute perforations into the general abdominal cavity. Sub-diaphragmatic abscess may form following posterior perforations and four of this series came to operation later for this complication. Two died, one of intercurrent pleuritic complication, three weeks after operation, one a year later (malignant complication); the other two cases recovered completely. These cases of perforation above referred to, test to the utmost a surgeon's skill and nerve. Not only must he make a rapid diagnosis, often in a farm house many miles from a hospital and the technique of the operating-room, at night, perhaps, with only the light a smoky lamp or a few candles can give; no assistance, no nurse, the family and relations questioning and obstructing, then must be considered the advisability of sending the patient miles to a hospital, or the decision to stay and do one's best, must be made. In any case, you, the practitioners, are the men of the hour, and you will be compelled to act quickly. It is unnecessary to detail all the difficulties one may find, as they are known to you all, the depth of the perforation, the difficulty of closure, the continual pushing out on the abdomen of the bowels and the still worse difficulty of getting these bowels back again. The most successful method of meeting this latter emergency is to take a towel rung out of warm water, and to envelop the intestines so as to make a sack such as one sees in a rupture, and to push the edges of the towel into the abdominal cavity. It may be wise in some cases of extreme shock and collapse to give a transfusion, some morphia or other radical supporting treatment, and to wait a reasonable time for reaction to take place, befor opening the abdomen. In this particular direction I have followed no easily definable course. I feel sure that almost as many lives are sacrificed by too great a hurry in operating as by an injudicious delay. This question, as well as that of the irrigation of the abdomen, gastro-enterostomy, excision of the ulcer and after treatment, may be discussed with benefit to us all. If it should be decided to send the case on to a hospital after a full dose of morphine, I must warn you that you may and will endanger still further your patient's life. It seems less risky to operate under the difficulties above enumerated, than to brave the delay and shock which will be caused by the exigencies of country transportation. Two of the cases of duodenal perforation were sent forty miles to the hospital after seven and eight hours respectively, and both died; whilst one case, operated upon under the unfavourable conditions furnished by a farm house, walked into my office six weeks later perfectly.

At best these cases are desperate as compared with the state of those patients suffering with some chronic condition. The latter can travel a thousand miles, and consultations and deliberations can be practiced and perpetrated on them without end. It is the emergency case, however, that tests the ability of the present-day surgeon, and I feel that our teaching in schools and in post-graduate work should have to do principally with the various emergency cases so wasteful of life, rather than with the diagnosis and treatment of rare and impossible diseases which oftentimes offer no hope of cure.

A Decreasing Mortality Rate—Frankel K. Lee, *The Public Health Nurse*, Feb., 1921, Vol. 13, page 73. The Metropolitan Life Insurance Company organized, in 1909, a visiting nurse service for its industrial policy holders. A large company with advanced methods of statistical analysis is able to gauge accurately any changes in the death rate and Dr. Frankel claims that allowing for the operation of other causes, eighteen thousand lives were saved by the health work done by the company among industrial policy holders in eight years. So by an expenditure of one and one-half million dollars in preventive work, three and one-half million dollars in death claims was saved. Perhaps the most striking feature of the Metropolitan Life Insurance visiting nursing work was that between the ages of twenty-five and thirty-four, the child bearing period, female industrial holders showed a mortal ty reduction of 20.5 per cent.

CANADIAN MEDICAL ASSOCIATION MEETING, HALIFAX, JULY 5th-8th, 1921

THE USE OF PITUITARY EXTRACT AND SCOPOLAMINE-MORPHINE IN OBSTETRICS

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THE introduction of pituitary extract and of scopolamine-morphine anæsthesia to the medical world occurred at about the same time and under somewhat similar circumstances. Both were first presented in a scientific spirit, but in the case of the one, the zeal of the manufacturing chemists, and in the case of the other the seeking after some new thing on the part of the lay press, caused extravagant claims to be made for these substances and in consequence, after the first enthusiasm of the medical profession, a decided reaction occurred. The great drug houses, through their ubiquitous travellers and their literature, assured the general practitioner that a new era had dawned in obstetrics; that he might throw away his forceps and go to his maternity cases armed only with a box of ampoules and a hypodermic syringe. The monthly magazines, especially those intended for the delectation of American female readers, related most wonderful tales of expectant mothers who entered a hospital and after a pleasant sleep had a charming nurse present to the mother, awaking fresh as a morn in May, a baby who the nurse assured her was her own. It was politely, but none the less decidedly, inferred that the great majority of the obstetric physicians who had not yet bowed the knee to this new Baal were old fogies and must remain so until they practiced this latest new method from Germany. Naturally such loose, and even ridiculous, claims caused discredit to fall on the use of both these vaunted aids in obstetrics.

Following the publication in the *British Medical Journal* in 1909 by Blair Bell, then assistant Professor in Obstetrics and Gynæcology in the University of Liverpool, the record of the results obtained from his employment of an extract of the pituitary gland in cases of post partum hæmorrhage, Cæsarean section, intestinal and vesical atony and shock, various preparations of this gland were put on the market. The history of new remedies as, for example, tuberculin and thyroid extract has repeated itself in the case of this substance in that after extravagant use it has fallen to some extent under suspicion, a suspicion which probably will come to be regarded as in some measure undeserved.

The pituitary body, or hypophysis cerebri, is a veritable cerebral gland, consisting of two portions, an anterior derived from the bucco-pharyngeal cavity, and a posterior developed from the floor of the third ventricle, with a pars intermedia lying between. The posterior lobe is composed of ependyma, neuroglia cells and small islets of epithelium. Animals may survive its removal for a long time, but when the anterior lobe is removed from adult animals they die, young animals may survive and, if so, they take on fat readily and sexual development is arrested. It is this portion of the hypophysis which, if affected, gives rise to acromegaly or conversely, infantilism, adiposis dolorosa, sexual hypoplasia and diminished carbohydrate tolerance. In the female the pituitary body is one-tenth heavier than in the male. It has been definitely proved that there is a definite functional hypertrophy during pregnancy. While this is diminished post partum the pituitary remains larger in multiparæ than in nulliparæ.

Schaefer and Oliver in 1895 showed that an extract made from it produced a marked rise in blood pressure. Little attention was paid at first to this finding, for the action of adrenal extract on blood pressure was more spectacular. Later Howell showed that it was the extract of the posterior lobe which caused this rise. This was confirmed by Schaefer and Swale Vincent. Schaefer and Magnus also discovered that the extract of the posterior lobe had a diuretic action. Dale showed that posterior lobe extract had a powerful action on uterine musculature,

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causing decided contractions, and Blair Bell was the first to put the infundibular extract to the clinical test. It was his paper which opened the eyes of the medical world. Ott, Schaefer and Mackenzie demonstrated a powerful galactagogue substance in the posterior lobe.

In the *Canadian Medical Association Journal* of September, 1913, B. P. Watson of Toronto gave a summary of the obstetrical uses of pituitary extract, a summary which Munro Kerr terms the best in the English language. To Professor Watson's article I am greatly indebted.

Watson's summary is as follows: (1) Pituitary extracts have a powerful effect in inducing and strengthening uterine contractions. (2) The type of contractions induced is similar to that which occurs normally although there may be a tendency to prolongation of the pains. (3) Such prolonged contractions result in slowing of the fœtal heart but the child is seldom in danger. (4) When given in the later part of the first, and in the second stage of full time labour, the polarity of the uterine contractions is not interfered with, but in early abortions and early in the first stage a spasm of the os may occur. (5) Its chief field of usefulness is in the first and second stage of labour when there is delay due to feebleness of the pains alone or when combined with other complications such as malpositions of the head, malpresentations, multiple pregnancy, slight narrowing of the pelvis, etc. (6) In the induction of abortion, in the treatment of abortion already in progress and in incomplete abortion, its action is so uncertain that it is not to be recommended except in cases where the os is widely dilated. (7) In the induction of premature labour its effects are uncertain but if sufficient dosage be given they may be good. (8) In the induction of labour at full term and after better results are obtained than in premature cases. (9) It gives good results in cases of post-partum hæmorrhage but is not superior to the various preparations of ergot. It has the power of sensitizing the uterus so as to allow these preparations to act more powerfully, the combination being most effective. (10) It is a useful adjunct in the treatment of placenta prævia used in conjunction with rupture of the membranes, the use of hydrostatic dilators or turning. Berkley and Bonney state that pituitary extract or ergotin should only be given in exceptional cases in the first stage in the uterine lethargy in primiparæ.

Williams' opinion of pituitrin is as follows: "I believe that we have in pituitrin a potent drug, which, while extremely useful in properly selected cases, may lead to disaster if injudiciously used. Furthermore, I consider it probable that its employment will repeat the history of ergot which was formerly used indiscriminately in all stages of labour, but is now employed only to stimulate the contractions of the emptied uterus, and that the use of pituitrin will eventually be limited to the latter part of the second stage and then only as a competitor with low forceps."

The Use of Scopolamine-Morphine in Labour

Scopolamine is the alkaloid derived from Scopolia atroproides or S. carniolica of Europe or S. berida or S. japonica of Asia. Scopolia is one of the solanaceous plants, and is allied to stramonium, belladonna and hyoscyamus. The alkaloids scopolamine and hyoscin are chemically identical. For clinical use the hydrobromide salt is employed.

In 1902 Steinbuckel reported the use of scopolamine and morphine in labour. Kronig and his assistant Gauss of the Freiburg Clinic in 1907 first brought to the attention, not only of the medical profession, but also of the civilized world, the combined use of the two drugs in labour to produce what was poetically termed Dammerschlaf or Twilight Sleep. A vast amount of literature on this subject has accumulated and twilight sleep which was so lauded in the lay press has among the medical profession its enthusiastic supporters and also its determined opponents.

The technic laid down by Gauss is as follows: The solutions must be freshly prepared. Narcophen, a proprietary preparation, a meconate of morphine, is used. The scopolamine must be that prepared by Straub, as other preparations have been found to be unstable. When labour has clearly begun, the woman is removed to a darkened private room. Cotton wool is placed in her ears, dark spectacles over her eyes and great care is taken to avoid as far as possible external stimuli. An initial dose of 1–6 grain of morphine or the equivalent dose of narcophen with 1–150 to 1–200 grain of scopolamine is given. Thereafter, various memory tests are applied, the idea being to keep the patient in a state of amnesia. The morphine is not repeated except in extreme cases of restlessness. The scopolamine is repeated, not after any definite lapse of time, but if thirty minutes after being shown an object the patient still remembers it, another dose of 1–400 grain is given.

In successful cases the patient passes into a somewhat somnolent condition with flushed face, injected eyes and an accelerated pulse rate and sleeps quietly in the interval between pains but complains bitterly during their continuance. A competent attendant remains continually in the room. In the second stage, ether, chloroform or nitrous oxide is often required. After delivery the child is removed from the room and on being wakened at the end of three or four hours, the patient is usually surprised to learn that her baby has been born. It is necessary to add that the element of suggestion enters very largely into this method and that it is not possible in the great majority of cases to have labour conducted under such ideal conditions.

Rongy in 1915 published a paper in the *American Journal of Obstetrics* wherein he reviewed the present status of twilight sleep based on a collective study of over 2000 cases. His observations were: (1) The Gauss method was followed in 90 per cent. of cases. (2) Standard or stable preparations of scopolamin were not used at first. Better results were obtained when a preparation such as that of Straub was used. (3) Morphine or narcophen was not repeated except in extreme cases of restlessness. (4) The treatment should not be instituted until there are definite signs of labour. (5) 90 per cent. of the cases were treated in a special room. (6) 80 per cent. of the cases were primiparæ. The average number of injections for primiparæ was 5½, for multiparæ, 3. (7) In about 60 per cent. the first stage was apparently shortened. The second stage was definitely prolonged. The third stage was not influenced. (8) 10 per cent. showed restlessness requiring restraint. (9) Four cases showed signs of active delirium during the post-partum period, but all recovered in a comparatively short time. (10) Treatment was discontinued in 4 per cent. of cases on account of: (a) too early administration, (b) disproportion between fœtal head and pelvis, (c) cessation of labour pains, (d) marked alteration of fœtal heart sounds, (e) repeated injections without any effect. (11) There was no maternal mortality. (12) Forceps were used in 26 per cent. of the primiparæ. Of these operations 80 per cent. were low cases. (13) A general anæsthetic was used during the stage of expulsion. (14) 78 per cent. of the babies cried spontaneously, 16 per cent. were oligopneic and required resuscitation, 3 per cent. were born asphyxiated but recovered, 3 per cent. were still born. (15) This form of anæsthesia is contra-indicated in primary uterine inertia, in labour associated with hæmorrhage, in cases where the fœtal heart sounds are feeble, and in multiparæ with a history of short labours.

His general conclusion is that the method is valuable in primiparæ of highly emotional type and in multiparæ in whom we anticipate a long and tedious labour. Berkley and Bonney state that scopolamine-morphine anæsthesia is especially indicated in cases of painful rigid cervix in the first stage with reflex inhibition of the uterine contractions and that the method is best suited to patients of nervous temperament to whom the anguish of labour is insupportable.

Hirst in his text book states that the best anæsthetic for the first stage, if one is demanded, is morphia and scopolamine. Personally he does not approve of this anæsthetic carried to an extreme degree or continued in the second stage of labour.

De Lee has the following dicta:

(1) The drugs may not be used to produce anæsthesia or insensibility to pain, only amnesia or forgetfulness. (2) The method is not adopted for general use in the home but only in maternities with a sufficient and efficient staff. (3) The fœtal heart tones must be noted from eight to four hours before the actual delivery. Personally he does not like the method.

Williams in his text book sums up thus:

"The fact that we cannot promise a satisfactory subjective result to more than three patients out of four makes it apparent that the method is not ideal and it is my belief that it will gradually fall into desuetude or at least its use will be restricted to a small group of neurotic patients in whom it is desirable to reduce suffering to a minimum. In addition to this relative defect several serious objections are inherent to this form of anæsthesia. In the first place, while some of its enthusiastic advocates claim that it results in a definite prolongation of the second stage necessitating more frequent instrumental interference with its additional danger of infection. In the second place, it is attended by a definite, but slight, increase in the fœtal mortality estimated at between 1 and 2 per cent. which is apparently due to direct poisoning of the fœtus.

A large proportion of the children are born in an apnœic condition, a smaller number are deeply asphyxiated but can be resuscitated without great difficulty, while occasionally the asphyxia is so deep that resuscitation is impossible. Apparently it has no effect upon the maternal mortality nor upon the incidence of post-partum hæmorrhage.

From my experience, the method is not adapted to private practice for three reasons: First, that it can only be expected to give ideal results when it is carried out by a trained personnel under suitable conditions; and second, that in a considerable proportion of cases it is attended by a degree of restlessness and excitement which may require physical restraint, and which makes a very painful impression on those interested in the patient. Finally, it makes such demands on the time and nervous equation of the physician as to put it beyond the reach of all but well-to-do patients, as the already underpaid obstetrician cannot be expected to devote twelve or fifteen hours of continuous service to a normal delivery which ordinarily requires but a few hours of his time."

In the 1912 edition of Tweedy and Wrench's "Practical Obstetrics," J. R. Freelands and Bethel A. H. Solomons report on a series of one hundred primiparæ in the Rotunda. Their conclusions are:

"(1) Scopolamine need not be given in larger doses than 1–120 grain. (2) In the majority of cases it may be given advantageously by mouth. (3) It is undesirable to keep patients in a darkened room whilst under its influence. (4) The patient should be carefully watched. This can be done equally well by the nurse as by the doctor. (5) No ill effects to mother or child need be expected to follow the rational administration of scopolamine. (6) Whilst its chief indication will be found during the first stage of labour, the fear of rapid delivery following its use is not a contra-indication."

Munro Kerr of Glasgow is of the opinion that the results of scopolamine and morphine injections have been fairly satisfactory. He states that nearly all authorities are agreed that labour is slightly retarded but that there is no predisposition to post-partum hæmorrhage. The method involves careful supervision of the patient by the accoucheur himself or by a very specially trained assistant. The ill effects on the fœtus seem to be often due to the repetitions of the morphine doses.

From the foregoing quotations it is apparent that the questions concerning the use of both substances are still in the stage of controversy or are at least *sub judice*. Of the two, pituitrin has the more settled place. It is generally agreed that it is of value in post-operative intestinal paresis and vesical atony in the field of surgery, and in post-partum hæmorrhage and in Cæsarean sections in the field of obstetrics. It is also agreed that it is of little or no value in cases of abortion or in the induction of labour especially before term. There remains then the question of its value in accelerating labour already in progress. To my mind the only indication for its use in this respect is in secondary uterine inertia in multiparæ where the head is on the perinæum and only a few strong pains are necessary to bring about its expulsion. We are all familiar with the elderly multipara whose pains die off just when they should be most effective. In these cases pituitrin acts wonderfully well. On the other hand, it should not be given before the os is fully dilated. I think it is wise not to administer it to primiparæ on account of the danger of having a severe laceration of the perinæum, retention of the placenta, or of affecting the child injuriously.

The question of dosage must be considered. While in the early days I have given pituitary extract in doses of one cubic centimetre without any untoward effects in the great majority of cases, I recall one case where it produced contractions so severe and painful that it was necessary to administer chloroform almost to the surgical degree. In another case where 1 c.c. was given an hour before the child was born there was considerable delay in the separation of the placenta. I think that a single dose should not exceed 0·5 c.c. or 8 minims. Kellogg of Boston is accustomed to give 5 minums at a dose and if the desired effect of strengthening the uterine contractions is not obtained in fifteen minutes he repeats the dose, but gives no more than two doses.

With regard to scopolamine and morphine my personal feeling is that the combination of the drugs is superior to the use of morphine alone. I have been accustomed to use a hypodermic tablet made by Parke Davis & Co., containing 1–6 grain morphine hydrochloride and 1–150 grain true scopolamine hydrobromide. This dose is given in the first stage when the pains have lasted some time without marked increase in the dilatation of the os and the patient is asking for some relief. The morphine is not repeated. Should a subsequent dose be considered necessary, and that should be only exceptionally, the dose should not exceed 1–200 grain of scopolamine. The ideal indication for the use of scopolamine-morphine injection would be in the case of a highly strung primipara with a rigid cervix, an occiput posterior position of the vertex, with no disproportion between the fœtal head and the pelvis, and further, that the patient should be either in a hospital or have two well trained nurses. The injection should be given in the first stage when the pains are not more than five minutes apart and last at least half a minute by actual count. On no account should morphine be given within two hours before the birth of the child. On two occasions I have seen children born apnœic and who, while they could readily be made to breathe, required watching for half an hour before breathing occurred with normal frequency and depth.

My general conclusions are these: (1) That in carefully selected cases and under certain definite conditions both pituitary extract and scopolamine-morphine injections are of marked value in obstetrics. (2) That when these conditions are not met with the results may be disastrous. Both are potent drugs and are not to be given lightly or unadvisedly. (3) That in times past the dosage has been too great. Single doses of pituitrin should not exceed eight minims. Doses of four or five minims are preferable. The total dosage before the uterus is emptied should never exceed sixteen minims (1 c.c.). In scopolamine-morphine anæsthesia the initial dose should not exceed 1-6 grain of morphine or 1-150 grain of scopolamine. In repeating the latter drug not more than 1-200 grain should be given. Morphine should not be repeated. (4) That scopolamine-morphine anæsthesia is more suited for use in hospitals than in private practice in homes.

In Honour of Mme. Curie—The June issue of the *Medical Review of Reviews* will be a special radium number dedicated to Mme. Curie. The issue will consist exclusively of articles on radium and its uses, written by the most prominent radiologists in the United States and Canada.

Copies will be sent complimentary to every physician interested in the uses of radium and any readers of this item who desire that issue may have it by asking for it from the *Medical Review of Reviews*, 51 East 59th Street, New York.

BENIGN NEOPLASMS OF THE FEMALE PELVIS

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I HAVE had the temerity to come before you and present a paper upon a subject which is one of the oldest in the surgical field; that of benign growths which occur in the pelvis. The literature is filled with reports and studies of this all important subject, and while perhaps there is nothing new which I can add to that which has already been published I may at least hope to refresh our memories. The importance of the subject is one which we will all admit because of the frequency with which these growths are encountered.

Historical. The first record of the successful removal of a uterine neoplasm of this character in America was one published by Dr. W. L. Atlee, the operation having been performed seventy-six years ago. From that time on this field has been thoroughly and conscientiously explored by many of the most famous members of our profession. Atlee's first operation was for the removal of a fibrous tumour from the peritoneal surface of the uterus. His usual procedure was the removal of the growth only, either per vaginam or by abdominal section. Occasionally he did a hysterectomy. One of his most important papers, "The surgical treatment of certain fibrous tumours of the uterus heretofore considered beyond the resources of art," was published sixty-seven years ago, *i.e.*, 1853.

The first deliberate hystero-myomectomy was performed in America by John Bellinger seventy-four years ago. The growth was elevated; ligaments divided and numerous arteries were tied, animal ligatures being used. The body was cut across three-fourths of an inch above the ostineæ and the growth removed. The wound was closed with sutures, peritonitis developed and death occurred on the fifth day. The autopsy revealed signs of diffuse peritonitis, but there had been no hæmorrhage. The first successful hystero-myomectomy was performed by Dr. Burnham in Lowell, Mass., in June, 1853, sixty-seven years ago. The abdominal section was performed in the expectation of removing an ovarian cyst, but the tumour proved to be a fibroid. As the ovaries were found to be diseased, they were also removed. Strong double ligatures were passed through the neck of the uterus and the cervix was dropped into the pelvis, the ligatures being brought out from the lower angle of the wound which was the procedure followed at that time. This was the first recovery after hysterectomy for fibroids. Dr. Burnham performed altogether fifteen hysterectomies with three recoveries, his second operation being done in 1854 and the third in 1857.

Dr. G. Kimball, of Lowell, was the first American surgeon to perform this operation, having previously made a correct diagnosis. This operation was performed on September 1st, 1853, sixty-seven years ago, the patient being in a serious condition from long continued uterine hæmorrhages. The cervix was transfixed, each half ligated and the body amputated in the supervaginal portion, the cervix dropped and the ligature brought out at the lower angle of the wound. The woman was well eight months later, but the ligatures were still attached. Kimball performed eleven hysterectomies with six recoveries.

Dr. H. O. Marcey was the first to evolve an improved method of treating the cervix, sewing it across with the cobbler stitch.

Dr. T. A. Emmet, thirty-six years ago, *i.e.*, 1884, was the first to utilize the peritoneum anterior to the uterus to cover the cervical stump.

Dr. M. A. D. Jones, in February, 1888, thirty-two years ago, was the first American surgeon to perform a pan-hysterectomy. This operation was done independently of Baudenhauer whose work was not known at that time in America. One of the most important steps in the advance of this field of surgery was devised by Dr. L. A. Stimson, of New York, who ligated the ovarian and the uterine arteries in their course as a routine measure, preliminary to the hysterectomy. This improvement in technic did away with the mass ligatures and very greatly reduced the

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risks of sepsis and hæmorrhage. During the period from 1844 down to 1890 admirable work was done in France and Germany by such men as Velpau, Massat, Martin, Zweifel, Sanger and Olshausen. In England, Keith, Thorton, Vantock and Hayward Smith did pioneer work along these same lines. In America this field has been exploited by Gardner of Montreal, Kelley of Baltimore, Emmet of New York, Wyeth, Chipman, John E. Price, John B. Deaver, the Mayos, and thousands of other skilful surgeons on this continent of equal repute but less renown than the ones above mentioned.

Pathology. Various definitions have been brought forward in the effort to clarify the atmosphere in connection with this important subject. Zeigler's is as follows: "A tumour is a new formation of tissue possessing an atypical structure, not exercising any function of service to the body and presenting no typical limit of growth." C. P. White's definition is clearer, *i.e.:* "A tumour proper is a mass of cells, tissues, or organs resembling those normally present but arranged atypically. It grows at the expense of the organism without at the same time subserving any useful function." It would, therefore, appear that these neoplasms are composed of cells, tissues, or organs resembling those normally present in the body, and we, therefore, must conclude that they have a like origin. It, therefore follows that classification is possible according to the type of cellular tissue present.

1. We must bear in mind that some of the tumours are composed of cells of one particular type.

2. Others show a tendency toward an arrangement of those cells in definite order with intervening stroma.

3 A further group shows cells derived from more than one type of tissue, *i.e.,* the mixed tumours.

4. Another group which shows a greater variation in the type of cells with a tendency not only to the development of irregular cell collections, but of such fully formed organs as brain, teeth, masses of bone, skin, glands, etc. We therefore have to deal with the teratoma, the blastoma, and the important subdivision of the latter fibroma; these latter being the most common form found in the region under discussion.

Teratoma. All monstrosities are teratomata. We may define the teratoma as an autonomous growth, the product of the continued development within one individual of another individual of the same species. We must emphasize the "continual development" in order that we may exclude the normal fœtus which possesses only a temporary development and then through its placenta penetrates into the maternal tissues.

Blastomas. This group includes all those that are not teratogonous. These tumours are an independent localized growth of tissue cells of one order. The typical blastoma is composed of cells which in their characteristics approximate to those of some adult tissue that is circumscribed and slow growing. The slowness of growth permitting reaction on the part of surrounding tissue so that in general they are encapsulated and sharply defined. Growth may for a time be arrested and then proceed. And unless it is in a position to press upon some vital part, or attain so great a size as to disturb the proper functions of the organs in its neighbourhood, the growth is harmless as long as it retains the characteristics indicated. The shape of the mass varies according to position embodied within a tissue and subjected to like pressure on all sides it tends to be globular. Situated on or near a surface so that the pressure on one aspect is less than on another it may spread laterally or become lobate or nodular. Such growths are spoken of as benign. They may grow slowly through the course of years, may never attain any great size and at most may become an indirect cause of death through mechanical disturbance of other functions. For our purpose the most important form of the blastomas are the fibromas. As the name implies the fibroma is a tumour composed of fibrous connective tissue and, therefore, may be met with in all regions of the body. Perhaps the female pelvis is that portion of the body that is most frequently attacked, the organs in which we most frequently find them being the uterus, and secondarily the ovary. Wherever they are found, the fibroma has for its essential constituent connective tissue elements. As such it is composed of connective tissue cells, bands of connective tissue fibrils, blood vessels and to a greater or lesser extent elastic fibre. Lymph spaces and channels are also present in a greater or lesser degree. Typically such growths form a well defined nodule which as it enlarges causes an atrophy, absorption and replacement of the tissues immediately surrounding it. Growth is as a rule slow and expansive. Fibromata proper do not form metastases and it may be laid down that they do not recur.

Ætiology. The two great groups of benign tumours of the pelvis are the fibroids and the degenerations of the ovary. Nearly all the authorities will agree that we know nothing of the essential cause of uterine fibroids. There are, however, certain factors that are supposed to influence their origin.

1. Heredity has been much referred to as a predisposing cause. While there are records of families where two or more members have been known to have uterine fibroids the influence of heredity must not be over estimated. Engstrom in 530 cases of uterine fibroids found a similar lesion in the mother or sister but thirteen times.

2. Age. The usual time or occurrence is during the time of sexual maturity. Fibroids are rarely found before the age of puberty and Findley is of the opinion that many if not all of these are of congenital origin. They are most frequent between the age of thirty and forty years and rarely arise after the menopause. In Miller's series of 299 cases, 120 were observed after the age of forty-five. Roger Williams in a report of 276 cases reports twenty-six under twenty years. One of the German authors reports a case in a child of ten and one of the French in an infant of three years of age. At the other extreme of life a submucous myoma is reported at ninety-two and a calcified myoma at eighty-six. It would appear from the study of statistics from a large series of authors that this type of new growth is prone to arise at a time when the sexual functions are waning.

3. Civil State. It is generally held that fibroids of the uterus are prone to occur in married women who have not borne children and in the unmarried. The number of children born to myomatous women is below the average while abortions are relatively common among them. The average number of children born of myomatous women is estimated to 2·5 as to the usual number of 4·5. Thirty per cent. of myomatous women are sterile as opposed to 10 per cent. of sterility in general.

4. Race. The negress is recorded as most susceptible to uterine fibroids. Kelley and Williams of Johns Hopkins where there is abundant opportunity for reliable observations deny this statement. In 367 cases reported by Williams fibroids were 2 per cent. more frequent in the coloured race and Kelley's statistics bear out these findings.

Frequency. It has been stated that 20 per cent. of the women who reach thirty-five years of age have fibroids while other authors affirm that 40 per cent. of the women who reach fifty years of age have fibroids of varying size and number. Of all non-malignant tumours uterine myomas are by far the most common. It has been estimated that 10 per cent. of all tumours in women are uterine fibroids.

Ovaries. The term ovarian tumour is applied to a series of degenerative conditions and new formations of the ovary, the most prominent clinical property of which is the enlargement of the organ. Physiological swelling occurs at regular periods but this as a rule is transitory and does not exceed an enlargement greater than that of half the size of an egg. Pathological enlargements from the standpoint of diagnosis should include those enlargements of the ovary exceeding that of the size of an egg.

These include: (a) Non-proliferating cysts. (b) Neoplasma. 1. Epithelial neoplasms (a) Cystoma simplex, (b) Cyst adenoma. 2. Ovigenous neoplasms, (a) Dermoids, (b) Teratoma.

II. Stromatogous tumours. 1. Fibromata.

The relative frequency of the different kinds of ovarian tumours varies greatly.

Taking 556 cases reported by Kelly they were grouped as follows:

Cystic Tumours	
Cyst-adenomata	247
Papillary tumours	54
Cyst-adenomata with malignant degeneration	21
Dermoid cyst	87
Multiple lutein cyst	1
Solid Tumours	
Carcinoma of the ovary	90
Sarcoma	19
Fibroma	24
Papilloma	13

The above diagnosis was made from the microscopical examination of the growths.

Another group of 555 cases present the following

Cyst adenomata	243
Cyst adenomata with malignant degeneration	5
Papillo adenoma	86
Carcinoma	81
Fibroma	83
Sarcoma	15
Dermoid cysts	90
Tumours from mullerian duct	2

The above is made from microscopical section.

As far as I have been able to discover very little is said by the various writers as to the ætiology of these most interesting conditions. It would appear, however, that cystic degeneration of the ovary is influenced by two widely divergent factors and that they appear in the following order:

1. This type of degeneration is found in a very large proportion of those women coming to the operating table who belong to the class known as the "higher educated". Whether the fact that considerable numbers of women during the menstrual epoch are being more and more compelled to devote their energy toward the development of their mental faculties, spending the hours in the class room, laboratories and passing tests and examinations, results in a marked interference of the blood supply to these important organs is perhaps a moot question, but it would appear that the experience of a very large number of operators bears out the fact that cystic degeneration in the higher educated is a very common experience.

2. Cystic degeneration appears to be a direct result of infection. Into the question of infection it is not necessary to enter here as that is one which we have all had a greater or lesser experience and the literature is filled with references to this important factor.

Diagnosis. Ovarian tumours. Ovarian tumours are connected with the uterus by a pedicle. This pedicle contains the same elements that connect the normal ovary with the uterus, *i.e.*, ovarian ligament and broad ligament. The ovarian ligament retains its original shape more than any other part of the pedicle. The broad ligament with the vessels, nerves, and connective tissue contains between its two layers, what represents the greater part of the true pedicle. The length of the pedicle varies greatly. Sometimes it is so short that the finger can barely be inserted between the tumour and the uterus, or it may be so long that the tumour can be pushed under the arch of the ribs. If the ovarian tumour grows toward the mesovarium and broad ligament it crowds the two layers of the lateral part and pushes in between them and thus becomes partially covered with the peritoneum of the broad ligament and becomes an intraligamentary tumour. Intraligamentary development is seen most distinctly in parovarian tumours which usually occupy the lateral part of the broad liagment.

For diagnostic purposes it is well to divide ovarian tumours into three groups.

1. Small ovarian tumours which still occupy the true pelvis.

2. Medium size tumours that have emerged from the pelvis but have not much exceeded a man's head in size.

3. Large tumours extending to the costal arch and to the liver, spleen, and kidneys.

In the case of small tumours that occupy the true pelvis the diagnosis is sometimes extremely difficult, for the uterus and tumour are usually so close together that the finger cannot be inserted between them. In retro uterine tumours a core can sometimes be felt running to the anterior surface of the tumour. These cases are, however, very exceptional and we should endeavour, to try to separate the tumour from the uterus. Either the tumour can be completely separated from the uterus as in the case of pedunculated tumours, or if the tumour develops between the layers of broad ligaments it should be possible to make out a distinct constriction between the tumour and the uterus. The nearer the tumour lies to the uterus the more difficult it will be to make out this constriction. The shape of an ovarian tumour is usually globular or oval, the surface usually smooth. Lobulations and protrusions are found in solid tumours and occasionally in dermoids. The cystic consistency of small ovarian tumours is usually not recognized. Small ovarian tumours are most frequently found posteriorly along the side of the uterine body or they descend into Douglas's space. In the differential diagnosis we must distinguish between acute inflammatory conditions, chronic oophoritis, myomata of the uterus and the difficulty of differentiating between ovarian and myomata must be constantly borne in mind, very rapid development being in the main more in the ovarian cyst while a smaller development points to myoma.

Medium Size Tumours. The demonstration usually presents little difficulty. They can usually be demonstrated by means of percussion and palpation and there is less danger of being deceived by an accumulation of fat or meteorism than in the case of very large neoplasms. In these tumours the chief points in diagnosis is a demonstration of the connection with the uterus, that is to say the feeling of the pedicle. The distinctness with which the pedicle can be demonstrated will depend on its position and firmness of the component tissue. The differential diagnosis of these medium size ovarian tumours employs a larger field than that of the smaller neoplasms because tumours of individual abdominal organs and of the abdominal walls must also be considered.

We must differentiate between encapsulated ascites and peritoneal exudate. Omental tumours may occasionally be confounded with ovarian tumours if they extend to the pelvis. It hardly seems necessary to remind ourselves of the fact that a distended bladder may easily be mistaken for an ovarian tumour because the position, shape, contour and consistency all combine to produce a resemblance. The writer saw a surgeon of no mean repute incise a distended bladder having mistaken it for an ovarian growth. Again the differential diagnosis between ovarian tumour and pregnancy must always be borne in mind. Extra uterine pregnancy is more likely to lead to confusion with ovarian tumour than with intra uterine because the uterus can be distinctly isolated from the cystic tumour.

Large tumours. The large ovarian tumours represent neoplasms that distend the entire abdomen. They lie above the pelvic inlet, extend up to or underneath the arch of the ribs on either side to the region of the kidneys and are in contact with the liver, spleen, and stomach. Here again an accurate diagnosis depends on the demonstration of the pedunculated connection with one horn of the uterus, but owing to the great tension of the abdominal walls and the close apposition of the tumour to the uterus, it is usually impossible to carry the external hand down to differentiate the tumour and feel the pedicle. The writer recalls a case in his own experience of a patient with an ovarian neoplasm with fluid contents which extended up to the liver, was adherent to the costal margin and contained four gallons of fluid. The distension of the abdominal wall was so great that plication of the rectæ was necessary. Here owing to the enormous size of the growth and the abundance of adhesions it was impossible to demonstrate any of the classical pathological entities. The patient, however, was fortunate in making a successful recovery. In the differential diagnosis of these enormous tumours, we must bear in mind the pseudo tumours, a condition which is sometimes met with in hysterical subjects. In these cases no more satisfactory diagnostic resource is at hand than a general anæsthetic.

Free ascites often simulates large ovarian cysts. A single manipulation of the abdomen may suffice to make the diagnosis, or it may be so difficult that all the diagnostic means at our demand are insufficient to clear up the case.

The other conditions which must be differentiated are pancreatic cysts, retro peritoneal and mesentric tumours, splenic tumours when they grow into the pelvic inlet and after they are the seat of cystic degeneration.

Tumours of the liver are occasionally mistaken for ovarian tumours if they extend to the pelvic inlet.

The Diagnosis of Uterine Myoma. In size uterine fibroids vary from almost microscopical to that reported by Hunter weighing 140 pounds and another reported by Sevarann weighing 195 pounds, Webster reports a case weighing eighty-seven pounds. This patient recovered from an operation performed almost wholly under local anæsthesia. This latter case is perhaps one of the largest uterine fibroids to be removed successfully.

Form. They are frequently somewhat smooth or rounded.

Consistency. Fibroids vary in consistency, some soft and fluctuating and others of wood-like hardness. The hard forms consist largely of fibrous tissue and low blood supply. Soft have a large amount of muscular tissue and are extremely vascular.

Rate of Growth. Soft fibroids grow more rapidly than the hard. During pregnancy fibroids grow very rapidly. After the menopause they decrease in size but frequently the period of the menopause is increased. It has been estimated that fibroids are seldom appreciable in less than a year and that in five years they may attain the size of a man's fist and in thirteen years to the size of a man's head. However, it is not possible to estimate the age of a tumour by its size, this being demonstrated by the many fibroids that are known to be of many years' duration, twenty or forty, namely the latent fibroid. It is exceptional for fibroids to exist singly. As many as 400 distinct and separate tumours have been found in a uterus.

Position. The position of fibroids in relation to the uterine wall is of the greatest clinical importance. All fibroids are originally intramural and they increase in size. They tend to grow in the direction of least resistance. The more pedunculated the tumour, the smaller the growth, the blood supply being limited. The writer has seen a fibroid of the uterus in which the blood supply has been entirely cut off, as a result of the torsion of the pedicle and a secondary blood supply which was enlarging the growth coming from omental adhesions. The three great forms of myoma with which we are familiar are the submucus, interstitial, subserous, and there is a fourth, latent fibroids, Bland Sutton being responsible for its nomenclature. On careful disection uteræ are frequently seen to contain numerous small bodies like knots of wood. Their whiteness is in marked contrast to the musculator. In hystological structure they are identical to large fibroids. The old literature contains many references to recurrent fibroids. In cases of recurrence it is unrecognized malignant growth or the development of fibroids which had been overlooked. According to the latest pathology there is no such thing as recurrent fibroids.

Hæmorrhage. Profuse menstrual hæmorrhage is the commonest as well as the most striking symptom occurring in 50 per cent. of the cases. At first it is apt to be confined to an excessive flow at the period, which lasts five to six days. Later as the tumour enlarges the flow is of longer duration and becomes more excessive in quantity. A little later the flow which has been regular although excessive becomes more frequent, appearing after three or over two weeks and leaves the patient prostrated from excessive loss of blood. A profound secondary anæmia results. The patient's skin is peculiarly transparent with a waxy yellow hue. She suffers from dyspnœa, epistaxis, and palpitation with a sense of utter weakness. Distinct hæmic heart murmur marks the distinct changes in the condition of the blood. The hæmoglobin may drop as low as 20 per cent. to 30 per cent. The red cells as low as a million and a half or two million. The leucocytes remaining about normal. With the profound changes in the blood a variable condition of blood pressure is found and in the majority of cases the blood pressure is markedly lower while in those women who have established a relatively immunity to hæmorrhage it remains comparatively normal. The mechanical symptoms produced by the small tumours are due to pressure on various pelvic organs while the larger tumours often become inconvenient from their size and weight alone and in addition derange digestion, deform the thorax, cause difficulty in respiration and interferes with circulation. The three types of myomata referred to above should be borne in mind as each is susceptible to modifications in the treatment.

Pain is a valuable symptom and is most marked when the uterus contains numerous myoma distributed throughout its walls. The pain is then usually menstrual in type, of a distressing, grinding bearing down character often likened to severe protracted labour pains. Pressure symptoms do not often occur until the tumours are large enough to choke the pelvis, when frequent urination and difficult defecation are common. When, however, a tumour becomes incarcerated under the promontory of the sacrum these pressure symptoms often become extremely urgent. We must, however, be on our guard against drawing hasty conclusions from the size and position of the tumour, but it is remarkable how well the rectum is able to retain the patalous channel under these circumstances. The bladder preserves its function by displacement, expanding upward into the lower abdomen. One of the most serious dangers which arises from the presence of large myoma particularly if developed under the pelvic peritoneum is the production of a hydroureter by pressure at the brim and thereby inducing a hydronephrosis.

Differential Diagnosis. Fibroids of the uterus appear most commonly during the period of sexual maturity, when pregnancy, inflammatory lesions and displacements are likely to arise and hence the differential diagnosis is of the greatest importance.

Interstitial Fibroid

1. Irregular enlargement of the uterus unless tumours are small.
2. Variable consistency.
3. Not tender to pressure.
4. Uterus freely moveable.
5. No history of infection.
6. Symptoms of uterine gandular activity not common.

Chronic Metritis

1. Uniform enlargement.
2. Uniform firm consistency.
3. Commonly tender on pressure.
4. Uterus usually restricted in its movements.
5. History of infection.
6. Symptoms of uterine glandular activity present.

Of greatest importance in the differential diagnosis is that of ectopic pregnancy and fibroid. This, of course, refers to the early stages of pregnancy. The most important points to be borne in mind in early pregnancy is:

1. The uniform rapid growth.
2. The intermittent uterine contractions.
3. The characteristic doughy consistency.

We must not lose sight of the fact that certain forms of fibroids are accompanied by nausea and vomiting, enlargement of the breasts and softened and discoloured vaginal cervix. One fact we must never lose sight of and that is, "That no other tumour than a pregnant uterus displays intermittent contractions."

The subserous fibroid must be distinguished from the hæmatoma and the hæmatocele.

1. In the subserous fibroid no history of recent pregnancy.
2. Slow continued development.
3. Consistency rarely soft.
4. Sharply circumscribed tumour.
5. Exploratory puncture negative.

Hæmatoma or Hæmatocele.

1. Frequently history of previous pregnancy.
2. Sudden development.
3. Consistency at first is fluctuating, later doughy.
4. Ill defined tumour.
5. Exploratory puncture blood obtained.

The differential diagnosis must also consider displacement, carcinoma, sarcoma, tubal and ovarian enlargements and pelvic exudates, and last but not least ectopic pregnancy.

The most common concomitant condition complicating fibroids.

1. Hæmorrhage.
2. Complicated pregnancy.
3. Septic infection.
4. Torsion of the pedicle.
5. Impaction.
6. Retention of urine.

Bland Sutton lays the rule down that a woman between the ages of thirty-five and forty who seeks relief because she suffers from retention of urine for two or three days before menstrual flow is almost certain to have a fibroid.

7. Intestinal obstruction.
8. Nutritive changes in the fibroid itself.
9. Cardiopathy of uterine fibroid.

The reasons for cardiopathy are not amongst the easiest to demonstrate, but the following may be considered.

(a) Excessive size of tumour, embarrassing the excursions of the ribs and diaphragm.

(b) Pressure on the ureters primarily affecting the kidneys with secondary cardiac involvement.

(c) Menorrhagia producing anæmia with secondary nutritive changes in the heart.

(d) Disturbances of the cardio vascular system from the influence of the tumour on the sympathetic and cerebro-spinal systems.

(e) Rapid failure in compensation where fibroids complicate pre-existing heart lesions.

10. Malignant degeneration in uterine fibroid occurs in from 2 per cent. to 4 per cent. and are usually sarcomatous.

Treatment. It is perhaps within the realm of conservatism to say that the treatment in all cases of neoplasms of the pelvis is surgical. That certainly is the opinion of the writer. Room for considerable difference of opinion arises as to the best method of dealing with the myomata, *i.e.*, on one hand there are the advocates of conservative myomectomy, on the other hand there are those who advocate supervaginal hysterectomy. Submucous fibroids come under a different heading and are to be attacked always per vaginam excepting in such cases where they fill the entire uterine cavity. It would appear that the abdominal route is infinitely more preferable than the vaginal despite the fact that the advocates of vaginal hysterectomy maintain that the operation is one that is performed with less shock than the abdominal.

In the hands of careful and rapid operators an abdominal hysterectomy presents the following advantages over the vaginal:

1. Greater rapidity.
2. Operation performed in *situ*.
3. More scientific treatment of the stump.
4. Absolute control of hæmorrhage.
5. Less liability of injury to the bladder.

The only objection to abdominal hysterectomy is that of the resulting abdominal scar. The charge of hardihood may perhaps be laid to the door of one who ventures to disagree with an authority of such recognized standing as Howard Kelley of Baltimore who was the first to develop the technic of conservative myomectomy in attacking uterine fibroids. While this may be the operation of choice in certain groups of cases yet the fact remains that when two or more intramural fibroids are removed by this method the expansile and contractile power of the uterus is markedly interfered with and the possibility of rupture during succeeding gestations must be borne in mind.

Further, numerous fibroids may be present which may escape the notice of the operator demanding a subsequent operation and hysterectomy. This has been the unfortunate experience of the writer in a few cases and is borne out by the experience of a number of his confrères. It would seem as a result of the study of statistics and observation of others and one's own experience that when a uterus holds more than two or three intramural fibroids that supervaginal hysterectomy is the operation of choice.

During the past few years the exponents of radium have vaunted its influence as a curative factour in dealing with this problem. In the last year or two, however, the pathologists are informing us that malignant degeneration is the result in a certain number of cases following radium emanations. Whether this is so or not I have no personal knowledge, but it would seem that we are unwise to deviate from a well beaten path which is accompanied with almost vanishing mortality to take up with an untried field where there seems to be a large element of doubt and more or less possible danger.

In closing I may be permitted to quote from one of the greatest of the American surgeons who says:

"That as a curative palliative and diagnostic agent the asceptic scalpel in the hand of the careful, conscientious and skilful surgeon stands without a peer."

Roosevelt Clinic, Seattle.

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Discover New Anæsthetic.—Discovery of a new local anæsthetic to be used as a substitute for cocaine, in anæsthesia, was recently announced by the University of Illinois, in whose laboratories the work was accomplished.

A further announcement to the medical profession is now made by The Abbott Laboratories, of Chicago. that this new anæsthetic will be supplied by them and will be known as Butyn.

This new product is structurally related to both cocaine and procaine, but clinical tests have shown it to be superior to cocaine in practically every respect. For example, it is more effective and less toxic; its solutions may be boiled without decomposition, it causes no dilation of the pupil of the eye, nor drying up of its secretions. It is less irritant than cocaine and much more rapid in its action. The anæsthesia produced by Butyn is of longer duration and its solutions are slightly antiseptic.

No Harrison narcotic blank is required in securing Butyn, as it is without the habit-forming disadvantages of cocaine.

Clinical work done by Dr. Geo. F. Suker and Dr. H. S. Gradle, of Chicago, prove this new anæsthetic useful as a substitute for cocaine. A two per cent. aqueous solution instilled into the eye will produce anesthesia so rapidly that operative work can commence at once, whereas from four to five minutes was formerly required where cocaine was used.

It is expected that this new discovery will soon be available for the profession. Further information may be obtained by writing to Research Department of The Abbott Laboratories, who have collaborated with the University of Illinois in developing this new anæsthetic.

Editorial

A NATIONAL HOSPITAL DAY

A CAMPAIGN has been instituted for the observance, in the United States and Canada, of May 12th, the birthday of Florence Nightingale, as a National Hospital Day. The idea is the same as that which has been so successfully carried through in "Arbor Day" and "Clean-up Day", namely, the education of the community by organized publicity and concentrated activity in the work and the needs of hospitals and their training-schools. "That the community shall know its hospital" is the slogan of the movement. The programme will include throwing open of such parts of a hospital as are adapted to public inspection during certain hours of the day, and the distribution of literature telling of its work and its needs. A special feature is to be made of the diffusion of information in regard to the training-schools for nurses. In this connection, the 12th of May is recommended as an eminently suitable date for an annual Graduation Day for nurses. Nurses' Homes are to be thrown open to all, and so far as may be practicable "open house" is to be held in all hospitals for school girls and others likely seriously to be interested in devoting themselves to the work of nursing the sick.

The suggestion of such a National Day, as has been outlined above seems to us very timely, and one hopes it may be carried through with success. All who are interested in hospital work realize that at the present the financial problem is a serious one and that a vigorous publicity campaign is essential to save the situation. The time is past when support for the care of the sick poor can be obtained through funds raised from private philanthropy. Not only are modern hospital methods expensive beyond anything formerly conceived of, involving physiological laboratories, *x*-ray equipment and other costly aids to diagnosis, and therapeutics, but the high cost of living and the superadded income tax absorb much of the money formerly available for charitable purposes. On the other hand, the increase of poverty and unemployment and the influx of a new and inexperienced immigrant population as yet unestablished in homes create a greatly increased number of indigent sick demanding care. The efficient support of hospitals has, therefore, become a problem of civic and national importance that can only be solved by obtaining the interest of the public and by bringing the responsibility home to those who have the control of taxation in their hands. Education is needed so that all may understand and realize the importance of the splendid work that is being done in our hospitals. The care of the sick, and the prevention of the spread of disease is as vital to a nation as the education of its children, and calls for similar special taxation.

The financial support of the hospital, however, is not the only aspect that causes serious anxiety at the present time. In addition to an expensive equipment, the modern hospital requires a personnel of nurses, trained and under training, whose services are devoted to that skilled care of the sick that is more important than any medication. The commercialism of the age, and the attractions held out by shorter hours, and higher pay, are depleting the ranks of applicants to our hospital training-schools so that an acute deficiency in the ranks of trained nurses seems likely to arise. To correct this tendency a committee has been formed in each hospital centre to secure the adoption of the birthday of the Great Founder of modern nursing as a National Hospital Day on which efforts will be made to bring the value of a modern hospital before every member of the community, and also to impress young women standing on life's threshold with idealism still dominant, and aspiring to a vocation as well as seeking a means of livelihood with the view that nursing is a profession and not a business, and that in its honour sacrifices must be rendered as well as privileges won.

GROUP DIAGNOSIS AND GROUP THERAPY

THE idea of a closer working alliance between groups of medical practitioners has received some attention in the pages of medical journals of comparatively recent date and has been discussed by physicians, surgeons and specialists. The idea appeals to many, while others seem to see in it a possible influence tending toward commercialism and a greater misunderstanding among medical men than obtains to-day.

There can be no doubt that the suggestion is the result of existing conditions. The advances in medicine have been so great that is is readily admitted by one and all that no one mind can master it in all its details. The existence of the specialties and their service to medicine and to the lay public are evidence of their need. A group of men concentrating their energies on different fields of medical knowledge and research can do better for the patient, in many cases, than can one mind be it ever so versatile, and so well trained medical men are indeed, in a sense, set apart for a special work, but no occupation or profession can be isolated from general community life. If medical men choose to group themselves together in a united effort, they are only doing what other men have found it necessary to do in other occupations.

The idea of group practice is not as new as perhaps it may seem. Since the days of hospital organization medical men have worked in groups, and to the advantage of the public and themselves. The possibilities of group practice can be seen in Rochester and the profession will watch with interest the group now being organized in Cleveland.

If group practice is to be a permanent arrangement for the carrying on of the practice of medicine, it must be conducted on approved principles. The man outside must be given help and management. The question of Group Practice and Group Therapy is not without interest to medical practitioners in the smaller towns and in rural districts. It might make greater laboratory facilities possible and prove economical in time and energy.

It also has a bearing on the subject of State Medicine. The best way to avoid state medicine is for the profession, by organization, to anticipate it, and group practice is worthy of consideration in this connection. State medicine might not prove more satisfactory than State railroading.

PITUITARY EXTRACT AND SCOPOLAMINE-MORPHINE IN OBSTETRICS

IN a paper on this subject by Ross Mitchell appearing in this issue a very complete history of the initial use and development of these methods in obstetrical practice is given. While nothing has been developed in the detail of this paper, a very laudable and conservative application of these methods has been suggested. Pituitary extract and its application was dealt with editorially in this Journal a short time ago, and we feel that there is no need for further remark upon the use of this drug.

Morphine-scopolamine used ethically and with no desire to produce theatrical results, is still a very valuable aid to the obstetrical practitioner. It is of considerable use in a few selected cases, particularly the nervous and aged primipara. In these cases where fear to a certain extent is the cause of a large amount of the general exhaustion, or where a particularly rigid cervix means a long trial to the patient's reserve, morphine-scopolamine seems to have a decided place. Our experience with the less toxic effects of heroin would incline us to the use of this agent in the replacement of morphine.

The two agents, pituitrin and the combination of morphine and scopolamine in their use, must necessarily be at the command only of the attendant who is thoroughly conversant with the condition of his patient and also with the peculiarities of the drugs.

One cannot too rigidly condemn the persistent tendency in certain countries and localities to make use of either agent as an incentive to the patient to choose certain centres as her temporary place of abode. To promise a patient the application, particularly of the latter reagent in her labour, has led without question to its abuse, and in large extent its discredit.

EARLY DIAGNOSIS OF DIPHTHERIA

UNDIAGNOSED and neglected cases of diphtheria terminating fatally are still too frequently met with in these days of perfected cultural diagnostic methods and specific therapy. That diphtheria is still one of the most fatal of contagious diseases is due essentially to the failure of early diagnosis and early treatment. Cultures should be taken in every case where there is the least element of doubt. Primary nasal diphtheria is the form most frequently overlooked, and constitutes a real menace to a community. Owing to the mildness of the attack and the absence of constitutional disturbances, a child with a so-called "cold" may walk about for weeks and attend school. Such a child is a particularly dangerous diphtheria carrier. It is noteworthy that some patients with pharyngeal diphtheria feel so astonishingly well that a throat examination is sometimes omitted.

The hospital is the only safe place for the most fatal type of diphtheria, the laryngeal type. The margin between life and death is indeed often a narrow one. Such a case may require instant intubation which can only be done by a man specially trained, who can be obtained at a moment's notice. All persistent nasal discharges, particularly when blood-tinged, and all throat exudates and membranes should have cultures taken. With this simple rule faithfully observed, diphtheria will be rarely overlooked, and the unnecessarily high present day mortality will be materially reduced. To render this possible it is essential that the departments of health in all our cities should establish easily accessible sub-stations where culture media and antitoxin may be obtained at any time without cost. This procedure is adopted in many large American cities and in some Canadian cities. From these stations cultures taken during the day are collected in the evening and reported upon the following morning. This makes the diagnosis of diphtheria so simple that given the facilities, neglect to make use of them would be unpardonable.

ON DIGITALIS THERAPY

IT has long been taught that the tincture and infusion of digitalis differ from each other, both in the quantities and kinds of active principles which they contain. The tincture has long been regarded as representing all the active principles of the leaf, but the infusion on the other hand, varies greatly in therapeutic activity even when prepared from the same batch of leaf. Digitalis leaves contain three glucosides: digitalein digitalin, and digitoxin, and an inert saponin body, digitonin. In any infusion of the leaves the large bulk of the first two are dissolved, but Hatcher has recently shown that these two substances, when given by mouth, are absorbed very imperfectly from the digestive tract, and that in oral administration the action of any digitalis preparation depends in great measure on the amount of digitoxin or digitoxin-like substance, which it contains. Digitoxin, unfortunately, does not dissolve in an aqueous preparation as readily as the first two, but is absorbed much more rapidly from the bowel. Carefully conducted experiments recently carried out by Dr. Hatcher and Dr. Weiss of Cornell University indicate that an infusion may be made by the following method, which will represent the total therapeutic strength of the drug, and which will preserve its strength for a year or more when sealed in sterile containers. The important conditions for the preparation of such an infuson are the fineness of the powdered leaf, the amount of water employed, and the length of time the drug is exposed to the temperature of boiling water. The leaf must be ground to a fine powder No. 60, and of this powder 10 gms. requires 1000 cc. of boiling water, and the heat to be maintained for one hour, with frequent stirring. The resulting infusion is then to be filtered and placed in sterile containers. Such an infusion has exactly one-tenth the strength of the official tincture. Excellent clinical results have been obtained from infusions made in this way and kept for more than two years. When a coarser powder is employed with a smaller amount of water, or insufficient time is given to the preparation, extraction of the active principles is imperfect, and what is very important a large percentage of the deficit consists of the important digitoxin element.

The Association

THE HALIFAX MEETING—JULY 5TH, 6TH, 7TH, 8TH, 1921.

WORD comes from Halifax that excellent progress is being made in the preparations for the annual meeting of the Association July 5th to 8th. The address in surgery will be given by Sir Lenthal Cheatle, K.C.B., F.R.C.S., of London, England, his subject being "Neoplasms of the Breast". The address in medicine will be given by Dr. D. L. Richardson of Providence, Rhode Island. The title of his address has not yet been received. Many prominent members of the profession in Canada and also from the United States have promised to contribute.

The following papers will be given in the surgical section: "Malignant Diseases of the Throat," W. S. Syme, Glasgow, Scotland. "Note upon Recent Cerebral Work," E. W. Archibald, Montreal. "Surgical Treatment of Deformities of Face and Palate" (with lantern slides), Fulton Risdon, Toronto. "Perforating Ulcer of the Stomach and Duodenum," George E. Armstrong, Montreal. "Ankylosis of the Elbow with Treatment by Arthroplasty," W. N. MacAusland, Boston. "Surgical Treatment of Goitre with special Reference to Cases of Hyperthyroidism and the Application of Basal Metabolic Rate," E. M. Eberts, Montreal. "Some Factors in the Ætiology and Diagnosis of Infections of the Renal Pelvis and Tubules," D. W. MacKenzie, Montreal. "Arthritis of Acute Infectious Origin," W. G. Turner, Montreal. "Some Cases of Unusual Interest to the Anæsthetist," W. B. Howell, Montreal; "Tonsil Operations," David H. Ballon, Montreal. The following will also contribute: J. S. McEachern, Calgary; A. Primrose, F. N. G. Starr, Toronto; Jasper Halpenny, Winnipeg; F. S. Patch, Montreal. A representative from the Mayo Clinic will also be present.

Amongst the contributors to the medical section are Drs. Rudolf and Graham, of Toronto; C. F. Martin, A. H. Gordon, F. G. Finley, Montreal. A number of papers have been promised, but unfortunately the contributors have not yet sent in their titles.

Sections of Public Health; Obstetrics and Gynæcology have been organized and we are informed by the Halifax Committee that there will be a good programme in each.

An *X*-Ray Section has not been definitely decided upon but if it is not held an effort will be made to secure prominent radiologists to take part in both the medical and surgical sections.

There wil be no special section in Eye, Ear, Nose and Throat. Papers contributed in these branches will be distributed throughout the medical or surgical sections.

We have the assurance of the Chairman of the Local Committee, Dr. S. L. Walker, that the arrangements which are being made for the entertainment of visitors, will leave nothing to be desired, and will come fully up to the reputation of the well-known Halifax hospitality. A Committee of Ladies has been formed, and ladies accompanying visiting doctors will be well looked after. The entertainments will include: reception and garden party at Government House; harbour excursion; a hodge-podge on Lawlor's Island; and an evening concert with illuminated boat parade at the Waegwoltic Club. In addition there will be many private functions.

Anyone desiring information or willing to contribute to the programme should write to the Chairman of the Programme Committee, Dr. A. I. Mader, 57 Morris St., or the Chairman of the General Committee, Dr. S. L. Walker, 14 Carleton St., or the Secretary of the Committee, Dr. W. L. Muir, 245 Robie St.

HOTELS

Halifax Hotel.—American Plan only, $5.00 to $6.00; $5.00 without bath and $6.00 with bath.

Queen Hotel.—American Plan only, rooms $4.50 to $5.50. $4.50 without running water, $5.00 with running water, $5.50 with bath.

Carleton Hotel.—American Plan only, $4.00 to $5.50. $4.00 without bath. $4.50 with running water, and $5.50 with bath.

Correspondence

211 College Street,
Toronto, Ontario,
March 18th, 1921.

To the Editor:

I AM writing to you to call attention to the editorial in the February issue of the Journal of the Canadian Medical Association in which the expression "Acute Abdomen" is commented upon and condoned.

Many years ago, a teacher of therapeutics in a medical college used to give his students the following definition of the class of remedies known as "alteratives": "The term 'alteratives' is the breast work behind which ignorance likes to skulk." Had his surgical colleague lived to hear this new abomination, possibly he would have defined the "Acute Abdomen" in the same words.

If the "Acute Abdomen", why not the "Acute Thorax", or the "Acute Head"? Possibly the originator of the first term was suffering from a condition suggested by the last.

Language must grow. In the course of this growth, new forms will appear and some superfluities will drop away, but the process is an exceedingly slow one. Language is of as long-lived a family as calamity. Words are in common every-day use which have come down through thousands of years from races which had no written language but which transmitted the word from mouth to mouth through various races to our own. It is true that there are languages which are called "dead" but while they may not be spoken as they were, their influence is indestructible.

On this continent, and particularly in the adjoining republic, there are millions of people speaking the English language, whose parents and ancestors spoke not a word o' English. Under such circumstances, it is inevitable that idioms from other languages should be more or less literally translated into English and that shades of meaning, unknown in Britain, should be given to English words in use on this side of the Atlantic. The marked illiteracy of the great majority of newspaper reporters is responsible for much of the loose and ungrammatical language appearing daily in the press. The fashion for gratifying the vanity of the masses, "the plain people," as distinguished from the classes, official or intellectual, by affecting an indifference to, or contempt for tradition, has led to all sorts of vagaries of speech and manners, so that to-day one can scarcely understand the jargon of certain pages of the newspapers such as the "Sports" and "Financial". The news columns are almost as bad.

Tradition is one of the most valuable assets of a nation and should be held in the highest respect so long as it does not clog the wheels of progress. There are some traditions which represent verities as fixed as is the position of the star in the firmament which Caesar chose for his simile of immutability. To these we should hold, and refuse to be alienated by the lure of any would-be popular writer, however attractive.

Whilst it is relatively true that "*qui non profecit defecit*", let us advance decently and with discernment, and not stop to pick up every piece of fool's gold that may catch the eye of everyone, but deceives only the lazy or the superficial.

Yours sincerely,

F. S. L. FORD.

Obituary

JOHN GEORGE McCARTHY, M.D.

DR. JOHN GEORGE McCARTHY died in New York on March 13th, 1921, on his return from Bermuda where he had spent several weeks to escape the rigors of a northern winter.

Born at Sorel, the son of the late Thos. McCarthy, first member for Sorel after Confederation, he graduated at McGill in 1888 and in 1890 was appointed assistant demonstrator of anatomy, later becoming demonstrator and in 1903 assistant professor in this department until his resignation in 1909. In these posts he was greatly appreciated by the students for his power of clear and graphic exposition, and for his genial and kindly bearing. His most important contribution to anatomical literature was a paper describing the Corrugated Core of the hippocampus major, a feature of gross brain anatomy which had till then escaped recognition.

Although retiring from active practice about a year before his death he retained an interest in the welfare of his former patients, as well as their love and regard, and many of them have good cause to remember his sympathy and generosity in tiding them over both physical and financial troubles.

Fond of outdoor life he was never happier than on an excursion on the river or on a fishing trip. His fund of humour and his genial character endeared him to a large circle of friends and particularly to the small group who accompanied him on his short excursions.

For the past two years Dr. McCarthy had had occasional attacks of angina. A period of freedom for nearly six months had raised hopes that the condition might be less serious than anticipated. A very severe seizure, however, attacked him on his way home and unhappily proved fatal.

Mrs. McCarthy, a daughter of the late Senator Murphy, with a son and daughter survive him.

Men and Books

A RHODE ISLAND PHYSICIAN PHILOSOPHER AND HIS DISCRIPTION OF A VISIT MADE BY HIPPOCRATES

Elisha Bartlett, the Rhode Island physician philosopher of the early 19th century, in an editorial in the first number of the *Monthly Journal of Medical Literature and American Medical Students' Gazette*, published in October, 1831, remarked that there were plenty of practical journals of high character, but that he wished to see one devoted to "medical history, medical literature, accounts of medical institutions and hospitals, medical biography, including sketches of the character, lives, and writings of the chief masters of our art, and of all such as have in any way influenced its destinies and left the deep traces of their labours on its history . . . To the medical student and the young practitioner, to all those who aspire to any higher acquisitions than the knowledge that calomel purges and salivates, and that tartarized antimony occasions vomiting, who are not willing to rest supinely satisfied in a routine familiarity with doses and symptoms, a familiarity which practice and habit render in the end almost mechanical, we cannot but think these matters must be interesting.

The devotion of an occasional hour to such pursuits must have a tendency to enlarge and liberalize the mind. It will help to keep alive and stimulate in the young medical scholar the sometimes flagging energies of study. By calling his attention and directing his desires to high standards of acquisition and excellence, it will urge him on towards their attainment. Delightful and fascinating, in many respects, as the study of his profession may be to him, there are many hours which must be occupied with mental and bodily drudgery. He must make what to others would be loathsomeness pleasure to himself. Amid the tear and wear, the toil and fatigue of such pursuits, he needs at times some intellectual recreation and stimulus, and where can he find one pleasanter or more appropriate than in surveying the career, and studying the characters of those who have trodden before him the same laborious path, and who have followed it on to its high and bright consummation? If our profession ever vindicates its legitimate claim to the appellation of liberal, it must be cultivated with some other than the single aim of obtaining patients for the sole purpose of getting for services rendered an equivalent in fees."

Bartlett's message of nearly one hundred years ago is presented to the readers of this column in the hope that it may inspire active co-operation and perhaps stimulate the inception of medical historical meetings throughout the country. How delightful and helpful it would be to have medical societies devote one meeting a year to this aspect of medicine and how much might be reaped from a fuller knowledge of the ideals and tribulations of those great masters who transformed the practice of medicine from a religious art to the highly scientific study of to-day.

This delightful man in one of his last publications "A Discourse on the Times, Character, and Writings of Hippocrates" gives a fascinating description of what he imagined Hippocrates at the age of thirty. Hippocrates is paying his morning visit to Abdera, and Bartlett describes the visit as follows:

"At the head of the bed, watching steadfastly and earnestly the appearance of the patient, is seated his physician, the already celebrated son of Heraclides and Phenarete, Hippocrates of Cos. He has just entered the apartment, to make his morning visit. His sandals have been taken off, and his feet washed by a slave in the vestibule. He wears over his linen tunic a large flowing mantle of light fine wool, suited to the season, not unlike the later toga of the Romans, fastened at the neck with a cameo of Æsculapius, and falling in graceful folds nearly to his feet. His hair is long, and both this and his beard are kept and arranged with scrupulous neatness and care. He is thirty years old, in the very prime and beauty of early manhood. His features, through these misty shadows of many centuries, we cannot clearly distinguish, but we see that his face is dignified, thoughtful, and serene; and his whole aspect, manner, and expression are those of high, antique breeding, of refined culture, and of rather studied and elaborate elegance

His examination of his patient was long, anxious, and careful. He saw at once that the gravity and danger of the disease had increased since his last visit. He inquired very minutely into the manner in which the night had been passed; and was told by the watchers that the patient had had no sleep, that he had talked constantly, had sung and laughed, and had been agitated and restless. He found the hypochondria tumefied, but without much hardness. The stools had been blackish and watery, and the urine turbid and dark coloured. He noticed the temperature and feel of the skin, and he studied for a long time and with great solicitude the general manner and appearance, the decubitus, the breathing, the motions, and especially the physiognomy of the patient. The only circumstance in the examination that would have particularly attracted the attention of a modern witness of the scene, would have been his omission to feel the pulse. With this exception, no examination of the rational symptoms of disease could have been more through and methodical.

Having satisfied himself as to the state of his patient, he retired to an adjoining room, followed by some of the attendants, to give directions in regard to the few simple remedies that he intended to use. The patient had already been bled, and had had a purgative of black hellebore. Hippocrates directed, that instead of the strained decoction of barley, which had been the patient's drink, he should now have honey and water, the favorite hydromel; that the bed should be made softer; the windows of the room still farther darkened; and that a warm flaxseed poltice softened, with olive oil, should be applied to the abdomen.

With a sad but decided expression of his fears as to the issue of the case, and a few kindly and pious words to the weeping wife, about the dignity, the solace, and the duty, in all our trials, of submission to the will of God, he gathered his mantle gracefully about him, and his sandals refitted by the slave who waited in the vestibule, and proceeded on his daily round of visits among the houses of the city."

JOHN BURROUGHS

John Burroughs, the famous naturalist and author, died on March 29th.

Nearly sixty years ago he wrote "Waiting", a poem which has found a place in scores of anthologies the world around, and the familiar lines of which are the property of us all:

"Serene I fold my hands and wait,
Nor care for wind, or tide, or sea;
I rave no more 'gainst time or fate,
For lo, my own shall come to me," etc., etc.

"I wrote this poem," said Mr. Burroughs to Joyce Kilmer, the editor of "Literature in the Making" in 1882, when I was reading medicine in the office of a country physician. It was a dingy afternoon and I was feeling pretty blue."

The poem first appeared in the *Knickerbocker Magazine.*

H. P. Wright

Abstracts from Current Literature

SURGERY

The Mechanism of Shock and Exhaustion.

Crile, Geo. W.: *J.A.M.A.*, Jan. 15th, 1921, Vol. 76, p. 149.

In shock or exhaustion man loses power to transform potential into kinetic energy in the form of heat, motion and mental action, despite vital organs that are anatomically intact.

Organs and tissues which fail in function and may produce acute exhaustion are the respiratory and circulatory systems, the blood, muscles, supra-renals, the liver and the brain.

The fat embolism theory of shock causation is untenable in many cases of profound shock where fat embolism cannot occur, as emotional shock, so common in battle. In this connection the prescribed remedy, carbon dioxide treatment, has failed in the treatment of shock. The primary cause of acute exhaustion may uncommonly be found in the respiratory system.

Failure of the heart, pooling of blood in the large veins, are not primary causes of shock.

In traumatic shock there is impairment of the vaso-motor mechanism, or it is exhausted, but this does not appear to be the primary cause of shock. The blood changes in cell content, diminished alkalinity, its concentration, etc., are not primary but secondary to increased tissue cell metabolism. The voluntary muscle of the body is not the site of the changes that cause shock. The supra-renals are proven to be essential to the function and survival of the brain, and they increase the oxyhæmoglobin in the lungs and increase the alkalinity of the blood. The supra-renals also exert a vital influence on the hepatic cells, and in liver cell alteration the brain cells are unable to work normally and become exhausted. The liver is essential to brain life, its removal causes death in a few hours, with progressive degenerative changes in the cerebral cells.

The brain cells depend on the blood for oxygen, carbohydrate fuel and sugar, as they have no stores of these, and the liver is essential for sugar at least.

The brain tissue transforms energy about ninety times as rapidly as an equal weight of voluntary muscle tissue, and the whole brain metabolism is five times greater than the metabolism of all the voluntary muscles. The more intense the brain activity the more the need for sleep. The whole man spends one-third of his time waiting for the brain to renew itself. The brain may be exhausted primarily while the blood pressure is normal or above normal—as in fever, excitement, physical strain, mental overwork, insomnia, anæsthesia, etc. On the other hand neither cerebral cells, cells of any organ, nor the man as a whole are exhausted immediately by unlimited trauma on areas cut off from connection with the brain by blocking the nerve supply.

Nitrous oxide limits exhaustion by lessening the oxidation of the brain cells and they are less driven by trauma.

The brain is the master tissue of the body, the most active energy transforming tissue of the body, and the exhaustion or shock of man is brain exhaustion. C. K. P. H.

Mesenteric Embolism in a Hæmophiliac.

Block, Frank Benton: and Goldberg, Samuel: *Ann. Surg.*, Feb., 1921, p. 229.

A preoperative diagnosis was made and recovery followed operation in a woman of forty-five years who was a true hæmophiliac—a rare condition in females. She gave a history of rectal hæmorrhages and subcutaneous hæmorrhages for years back. The onset was sudden, with severe crampy pains and almost continuous vomiting. A resection was done and there was wound oozing on the table for which horse serum was given. It continued, and twenty-four hours later a citrated transfusion was done which checked the bleeding. C. K. P. H.

Pseudo-polycythæmia—Extraordinary Blood Changes in a Patient with Renal Calculus.

Herman, Leon and Lyon, B. B. Vincent: *Ann. Surg.*, Feb., 1921, p. 223.

The patient, aged forty-nine years, showed a most extraordinary blood count. He had been aware of an abnormally high blood count prior to onset of symptoms in 1897, thought to be due to appendicitis, but which was due to renal calculi and ureteral adhesions to the lower end of the right kidney. Symptoms of definite renal colic occurred in 1900, with the passage of stones. He came for operation in March, 1919. His erythrocytes were 11,496,000, hæmoglobin 115 to 120 per cent., white blood cells 11,600, clotting time 7½ minutes.

Nephrectomy was done and three days later hæmoglobin was 108 per cent., red cells 5,504,000, and leucocytes 11,200. Thirteen days after operation white blood cells were 260,000, next day 242,000, with erythrocytes 4,480,0000 and hæmoglobin 90 per cent. He was afebrile four days later with hæmoglobin 88 per cent., reds 4,360,000 and whites 22,800.

One year after operation blood count was normal. No explanation is offered for this polycythæmia prior to operation, nor for the most unusual flood of white cells after operation.

C. K. P. H.

Blood Analysis and Biological Reactions in Surgical Conditions.

'Depage, A. and Govaerts, P.: (Analyse du Sang et Reactions Biologiques dans les Affections chirurgicales): *J. de Chir.*, Jan., 1921, Vol. 17, p. 5.

The authors limited their study to results furnished by examination of blood in post-hæmorrhagic anæmia which they consider a problem of great practical importance. The critical blood pressure, according to their findings, is in the vicinity of 80 mm. of mercury, as death always follows if this low blood pressure be continued for several hours. The grave danger is not due to the lowering of the number of blood corpuscles but to the diminution in the mass of the blood.

Prognosis is based on three conditions (1) lowering of the blood pressure; (2) evaluation of the mass of the blood; (3) cause and method of the production of the hæmorrhage.

Hæmorrhages are classed as moderate or severe. After moderate hæmorrhage the blood count in the first six hours is 4,500,000 to 5,000,000. After severe hæmorrhage during the first three hours the count is less than 4,500,000, in from six to eight hours less than 4,000,000, in from eight to twelve hours less than 3,500,000. If 4,000,000 are observed during the first six hours following a severe hæmorrage death usually follows within twenty-four hours.

Intravenous saline injections are indicated in all moderate hæmorrhages but are contra-indicated in all severe ones. In severe cases blood transfusion is the treatment advised. Post-hæmorrhagic anæmias result in dilution of the blood by the tissues. In man this phenomenon is not complete until after three days. Anæmia is increased by infection, and may be masked by asphyxia, peritoneal reactions and acidosis.

In man the first blood picture of hæmorrhage is not diminution of the red cells but increase in the white cells. The sign aids in the diagnosis of internal hæmorrhage. In blood transfusion if the blood cells injected have been selected in a manner to avoid agg utination they persist in the circulation for at least ten days. R. B. M.

Hydrocephalus in Chondrodystrophy.

Dandy, Walter E.: *Bull. Johns Hopkins Hosp.*, Jan., 1921, p. 5.

Dandy's work upon the ætiology and the treatment of hydrocephalus in the past few years has now gained wide recognition, as it deserved, for it has been fundamental. His simple expedient of injecting air into the cerebral ventricles, and subsequently taking *x*-ray plates, a procedure which when properly done gives an excellent picture of the size and shape of the ventricles, has put us a long step forward in diagnosis. The present article applies this principle in the elucidation of a condition concerning which hitherto we have not had definite knowledge. Chondrodystrophy, or achondroplasia, is a well-known form of dwarfism characterized by a combination of short arms and legs, long trunk, and big head, in which the pathological lesion consists in well-known changes in the epiphyses of the long bones. Parrot's description in 1878, was the first to establish the malady as a clear cut clinical entity. The big head has been somewhat puzzling to pathologists and clinicians alike. Virchow first called attention to the shortening of the base of the skull and explained it as a premature union of the tribasal bones. Kaufmann showed that this was due to a lack of development of the bones at the base of the skull, and others have observed that the enlargement of the head was inversely proportional to the development of intellect.

Dandy reports two cases, in one of whom, a boy of nineteen, he was able to demonstrate by ventriculograms a condition of marked hydrocephalus; the patient's mentality ,was little greater than that of a boy of six or seven. The cause of the hydrocephalus remains unclear, but Dandy's explanation is very plausible. One may quote his own words: "It is conceivable that the shortening of the base of the skull (which is part of the disease) may compromise the growing brain as to volume but more vitally as to position. A certain degree of kinking or bending of the brain stem should follow, and it is possible, or even probable, that thereby the lumen of the aqueduct would be reduced producing a partial occlusion . . . or it might obstruct the cisternæ under the pons and midbrain. This would inevitably cause hydrocephalus." He goes on to suggest that operation at an early stage to relieve the hydrocephalus would very possibly prevent the mental deterioration which is sure to develop. The article deserves attention, not perhaps so much because of its clearing up of an obscure condition in chondrodystrophy, which is a rare disease, but as an illustration of the value of these newer methods in the diagnosis of cerebral lesions accompanied by hydrocephalus. E. A.

The Diagnosis and Treatment of Hydrocephalus due to Occlusions of the Foramina of Magendie and Luschka.

Dandy, Walter E.: *Surg. Gyn. and Obst.*, Feb., 1921, Vol. 32, p. 112.

There is a specific cause for every case of hydrocephalus, which can be located by clinical tests during life. In a great many instances this cause may be removed by operative interference with every hope of a permanent cure.

One of the most common types of congenital hydrocephalus is caused by the closure of the foramina of Magendie and Luschka These foramina form the normal channel for the passage of spinal fluid between the fourth ventricle and the subarachnoid space. These foramina are essential for the normal equilibrium of the cerebro-spinal fluid. In the ventricles the fluid is secreted; in the subarachnoid space it is absorbed. The closure may be due to the failure of these foramina to develop, or to a mild type of meningitis.

In adult life the clinical picture is difficult to differentiate from that of a cerebellar tumour.

In obstructive hydrocephalus, indigo carmine injected into a lateral ventricle is not recovered in the spinal canal. To determine the exact site of the obstruction the use of ventriculography is necessary. The ventricular fluid is completely removed and air substituted. By means of the x-ray the exact site can then be located.

The treatment consists in the formation of a new opening between the cisterna magna and the fourth ventricle.

The writer operated successfully on two adult cases. Subsequent ventriculograms showed the new foramen to be functioning. G. A. F.

Primary Pyloric Ulcer, cured by Gastroenterostomy. The Appearance of a Second Chronic Ulcer (nonpeptic), on the Lesser Curvature of the Stomach. End to end Gastroenterostomy, duodenojejunal Enteroanastomosis. Cure.

Ulcére pylorique primaire, guèri aprés gastroentérostomie, apparition d'un second ulcère chronique (nonpeptique), à la petite courbure de l'estomac; gastroentérostomie termino-terminale, entéroanastomose (duodeno-jéjunostomie). Guerison. Kotzareff, A. et Balmer, P.: *Lyon Chir.*, Vol. 17, p. 449, July–Aug., 1920.

Patient was a male forty-seven years old, who for two years had had symptoms of pyloric obstruction. He was operated upon in January, 1917, when a movable tumour was found in the region of the pylorus: this was considered to be malignant and inoperable. A posterior gastroenterostomy was performed. The patient recovered his health and remained well until October, 1919, when he again suffered from gastric symptoms, These became gradually worse, and he was operated upon for the second time on January 12th, 1920.

At this operation it was found that the supposed malignant tumour of the pylorus had completely disappeared, leaving only a stellate scar on the anterior surface of the pylorus. An ulcer the size of a franc was found on the posterior wall of the stomach near the lesser curvature, about 12 cm. proximal to the gastroenterostomy opening.

The operation consisted of excision of the greater part of the lesser curvature and about one-third of the greater curvature. This necessitated the excision of the portion of the jejunum at the point of the former gastroenterostomy opening.

An end-to-end gastrojejunostomy was performed as well as an end-to-side entero-enterostomy.

The patient made an uneventful recovery, and left the hospital three weeks after the operation. He has continued to enjoy good health ever since.

The authors raise the following questions:

1. Is gastroenterostomy sufficient to cure a pyloric ulcer?

2. Does it prevent the formation of further ulcers?

3. Does it prevent the carcinomatous degeneration of the ulcer?

They state that along with Dr. E. Bircher they believe that these questions may be answered in the negative, and consequently they advocate "Excision of over one-third of the stomach in all cases of pyloric ulcer, where the patient's condition warrants the operation."

G. J.

Notes on the Ætiology of Goitre.

Notes sur l'étiologie du Goitre. Boitel, M. M.: *Rev. Med. de la Suisse Rom.*, Nov., 1920. p. 717.

In a long article well illustrated by maps of the district, the author after a short review of the history of the work done on goitre, discusses the physiology, pathogenesis and evolution of the disease. The various theories of the ætiology are discussed, special attention being paid to the chemical, infectious and physico-chemical theories.

In this connection he gives the result of his examination of the case reports of all the goitre cases (living in the Canton of Vaud), who were admitted to the Cantonal Hospital at Lausanne, during the thirty years from 1887 to 1917, also the statistics of the federal board of health for the same district.

The following are the points to which the attention is directed:—

1. The hereditary antecedents noted in each case.

2. The possible influence of a strumigenous factor attacking newcomers to a district in contra-distinction to the native population.

3. The natural grouping of cases of goitre following the physico-geographical conditions.

4. The relation to typhoid fever, in so far as it is an infectious water borne disease.

5. The relative incidence in the rural population.

The following conclusions are arrived at:—

1. That goitre is very irregularly distributed throughout the Canton of Vaud.

2. That the distribution seems to coincide with certain physico-geographical groupings. The minimum is found in the Jura Chain, particularly on the east flank; the maximum is found in the valleys of Broye and Mentue. The plain of the Rhone is more affected than the neighbouring mountains.

3. Heredity is present in 47 per cent. of cases.

4. No distinction was apparent as to the relative susceptibility to the disease as of newcomers to the native population.

5. That goitre has a distribution entirely different from that of typhoid fever, in fact that places where the incidence of typhoid was greatest the incidence of goitre was least and vice-versa.

6. The rural population are slightly more susceptible than the urban population but the difference is not marked.

7. No proof could be found that the primary cause of goitre is the want of free iodine.

The distribution of goitre in Switzerland does not correspond with the zone described by Hunziker as associated with the climates of regions located between the altitudes of 600 and 1,000 metres.

A very full bibliography is attached. G. J.

A Clinical Study of Eighty-three Gastrojejunal Ulcers.

Eusterman, G. B.: *Minnesota Med.*, Nov., 1920, Vol. 3, p. 517.

Gastroenterostomy for benign ulcers is highly successful. Some causes of disappointment are as follows:

1. About two-thirds of the surgical failures occurred in cases in which operation was performed in the absence of a lesion intrinsic to the stomach or duodenum, especially where the symptoms are of neurotic origin.

2. Defects in surgical technique such as (a) The stoma being made too large or too small or improperly placed. (b) A long jejunal loop, or where the direction of the proximal portion of the jejunum is from left to right.

3. The failure to remove a diseased gall-bladder, appendix or the ulcer itself at the time of operation.

In a series of 3,700 gastroenterostomies for benign ulcer in the Mayo Clinic, *gastro-jejunal ulcer* was the cause of a secondary operation in 1.3 per cent. The symptoms may be identical or similar to the original complaint and in 88 per cent. appeared within one year after the original operation.

In making a differential diagnosis certain possibilities must be excluded such as the formation of a new ulcer, carcinomatous changes in a chronic ulcer, or the reactivity in the original partially healed ulcer.

Important features in reaching a conclusion are: (1) gross gastric retention, (2) small movable mass in the region of the umbilicus, (3) post-operative pain assuming a lower level, (4) bleeding, in the absence of preoperative hæmorrhage, (5) rœntgenologic examination.

The actual cause of the lesion has not yet been definitely determined. The use of unabsorbable sutures is a highly important factor as the material is often found at the second operation in the suture line or in the ulcer area. Contributory cause may be in the rough handling or bruising of the tissues.

It is rather remarkable that the ratio of males to females with this condition is seven to one.

The author points out, that our greatest hope of reducing the incidence of the disease lies in a careful operative technique combined with immediate and continued post-operative medical management. G. A. F.

Some Remote Results of Invervention for Meso-gastric Ulcers. Quelques résultats èloignés d'interventions pour ulcéres méso-gastrique. Lecene, P.: *J. de Chir.*, Jan., 1921, Vol. 17, p. 1.

The author gives reports of five cases of ulceration of the stomach involving the middle zone. The symptoms in all the cases were typically those of gastric ulcer which was confirmed at operation. The summary of each is as follows:

Case 1. Suffered for fifteen years with gastric symptoms, having been operated upon in October, 1910, when notes of the condition were made as follows: Marked thickening of gastric wall from level of lesser curvature to greater occupying the whole mid-gastric area with consequent narrowing. There was no narrowing of the pylorus. Diagnosis—meso-gastric ulcer. Meso-gastric resection with end to end anastomosis was done, particular attention having been paid to direct ligation of vessels which the author considers as the most important step in the technique of the whole procedure. Sutured without drainage and uneventful recovery. This case was seen again in 1920 and has been classed as a cure.

Case 2. Suffered for twenty years, operated upon in January, 1913. A meso-gastric ulcer was found on the lesser curvature. There was marked narrowing of the stomach, the posterior wall of which was adherent to the pancreas. Meso-gastric resection was done which did not change the form of the stomach but only shortened it. Uneventful recovery. Case was seen again in 1920. Patient eats everything and works every day in factory.

Case 3. Suffered for thirty years. Operated upon in March, 1914. In this case a new oblique incision was used instead of that in the median line, and was employed in all subsequent cases. The oblique incision extended from the left costal border to a point a little above the umbilicus in the midline, cutting the left rectus obliquely. An hour-glass stomach was found, the posterior wall of which was adherent to the pancreas. Meso-gastric resection with end-to-end suture was done. Seen again in 1920 when stomach condition was entirely cured.

Case 4. Suffered for twenty-five years. Operation June, 1914 An hourglass stomach found, but as the patient was in poor condition resection was not performed but gastro-gastrostomy similar to pyloro-duodenostomy of Finney was done. This patient was seen again in 1920 and during the interval had two attacks of gastric distress each, however, having been relieved within a week by dieting.

Case 5. Suffered for four years. Operation in June, 1914. An hour-glass stomach found and meso-gastric resection was done. Seen again in 1920. During the last few months there has been a recurrence of pain and loss of weight.

The author emphasizes the oblique incision and the importance of direct ligation of vessels in gastric surgery. R. B. M.

The Surgical Treatment and the Pathology of Gastric and Duodenal Ulcer. Deaver, J. B., and Reimann, S. P.: *Surg., Gyn. and Obst.*, Feb., 1921, Vol. 32, p. 103.

The authors believe that the treatment of chronic peptic ulcer is, with but few exceptions, essentially surgical. Few ulcers give symptoms sufficiently early to enable them to be treated medically with any degree of success.

In his series of cases (comprising one hundred and three) 90 per cent. had freedom from symptoms two to three years after operation. Excision of the ulcer with knife or cautery is the operation of choice, but cannot in all cases be carried out, owing to its position, or to the involvement of neighbouring viscera.

Gastroenterostomy should also be performed in all cases where marked hyperacidity is present before operation. The success of the operation depends to a large extent on the post-operative treatment. Restriction of the diet for at least six months is most essential. G. A. F.

Artificial Pneumothorax in Fractured Ribs. Soresi, A. L.: *J.A.M.A.*, Feb. 5, 1921, Vol. 76, p. 379.

In a case of fracture of the sixth, seventh and eighth ribs where strapping failed to relieve the pain, Soresi induced an artificial pneumothorax, repeating nitrogen injections three times, giving great relief to the patient.

He suggests this form of treatment provided there is no injury to the lungs or pleura, thereby putting the affected thorax at rest. F. J. T.

ORTHOPÆDICS

The Necessity of Orthopædic Training; its Relation to the Prevention and Cure of Deformities. Jones, Robert: *Brit. Med. Jour.*, Feb. 5th, 1921, p. 181.

In this, the Cameron Lecture at Edinburgh University, Sir Robert Jones begins by indicating elementary orthopædic principles to be invoked by the family physician. In the case of congenittal club-foot the cure should be begun early, long before the baby can walk, and should be carried through to a conclusion. The child should be able when cured to even correct voluntarily its own deformity.

Attention should be paid to the prevention of rickety deformities by insisting on mother's milk, fresh air and the avoidance of overcrowding. When the bones are soft, crawling and walking should not be permitted. Tuberculous joints come first under the eye of the practitioner, by whose efforts deformity may be minimized.

In acute anterior poliomyelitis, treatment should consist of complete rest of nerves and muscles and should be undertaken early in the disease. Paralyzed muscles should not be allowed to be overstretched.

In discussing orthopædics in the war mention is made of the deplorable lack of orthopædic training seen in the early years, especially in connection with malunion and nonunion fractures, scars, and stiff joints of all kinds. In consequence of this orthopædic centres were formed, until 20,000 beds were eventually in use. The advantage of segregating certain cases under surgeons especially interested in them was insisted on, as for instance fractures of the femur. Surgeons had to be especially trained for military orthopædic surgery, and mention is made of trained orthopædic surgeons from America.

Sir Robert Jones then goes on to speak of the lack of orthopædic lectureships and clinics in Britain, and points out that orthopædic surgery was looked down upon formerly because it was supposed to deal only with flat-feet, knock-knees, club-feet and certain other deformities. With the war, however, had come a gradual expansion of its definition and with this the demand for a higher degree of skill. The organization of an Orthopædic Department for a teaching hospital is then discussed. It should not be simply an outdoor department, but should have as many beds as are necessary for the orthopædic material, about forty beds out of a three hundred bed surgical service. At its head should be an orthopædic surgeon. An orthopædic registrar, or assistant surgeon should be selected as a man desirous of practicing orthopædic surgery. The house-surgeon should be appointed for at least six months, and the nursing staff should be permanent, as much time and perseverance are necessary to train them in the application of splints and plasters.

A physio-therapeutic department should be closely allied to the orthopædic, but still independent of it, as a department used by all the physicians and surgeons.

Whatever definition of orthopædic surgery is adopted, the general surgeon should have the right to admit any cases to his wards. The scope of Orthopædic Surgery according to Sir Robert Jones should be: (a) Congenital and acquired deformities of the spine and extremities. (b) Infantile paralysis after the acute stage. (c) The deformities of adult paralyses. (d) Stiff and ankylosed joints. (e) Torticollis. (f) Disabilities of joints, such as rupture of crucial ligaments, injuries to semi-lunar cartilages, snapping hip, slipping patella, and those conditions which are included under the aggressive title of "bone-setting."

The orthopædic surgeon should have the right, in common with the general surgeon to treat recent fractures. If he is competent to deal with malunited fractures he should find it easier to prevent deformity than to reconstruct the limb.

The teaching of orthopædic surgery, in a Medical School is then discussed. This is best done at the end of the curriculum and should consist of some twenty demonstrations of two hours each, fo· the most part given in the out-patient department.

Sir Robert Jones ends by advocating country, as opposed to city hospitals for crippled children, and diplomas and university degrees in orthopædic surgery. Edinburgh University is congratulated on establishing an Orthopædic Department with a Lectureship. J. A. N.

Traumatic Dislocation of the Knee Joint.

Platt, Harry: *Brit. J. S.*, Vol. 3.

The writer, after referring to the numerous cases, of varying severity, of injury to the crucial ligaments, met with more especially in military surgery, reports a case of traumatic dislocation of the knee, the result of a fall in April, 1916.

It is noteworthy that, at the time of accident, there was very little effusion in or about the knee joint, and that there was no sign of vascular obstruction in the lower leg.

The diagnosis was confirmed by *x*-ray. Reduction under anæsthesia presented no difficulty.

The after treatment consisted of seven days in hospital and the patient was then discharged with the knee immobilized in a plaster cast. This was worn for four months, and followed for six weeks by a Thomas caliper splint. The patient then walked with comfort, and seven months after his accident resumed work at general labour.

At the time of removal of the plaster cast there was only 5 degree movement in joint but stability was good. Eleven months later, movement had increased to 20 degrees, beyond which, firm resistance was encountered. It was considered that further increased range of movement would not occur, and the stability of the joint was excellent.

In May, 1920, the patient reported that he had served two years in the army without any incapacity, and on demobilization wa fit for the heaviest work.

The knee joint shows now four years after the accident, a flexion movement of 90 degrees, perfect stability and, is in all other respects normal.

The writer emphasizes, as the one essential feature in the after treatment of all grades of crucial ligament injury, the continuation of immobilization for a considerable period, pointing out that stability of the knee joint must be aimed at, even at the expense of range of motion.

W. J. P.

Fascia used to Mobilize a Stiff Knee the Result of Gun Shot Wounds.

Goddu, L. A. O.: *Boston Med. and Surg. Jour.*, Feb. 24th, 1921.

This is a case report of a young man who suffered a shotgun wound of the left knee in October, 1915, with considerable loss of soft tissue and a partial loss of patella and articular surface of the femur. Suppuration followed, but healing occurred in four months. The condition in April, 1916, was that of a very painful stiff knee showing at most only 5 degrees of movement.

On April 24th, 1916 a fascia lata transplant was done in the joint, and movement begun four days later. In ten weeks time, the patient was back at work, with 75 degree movement, and in December, 1916, he reported that he had not lost a day's work and now had 90 degree movement. In December, 1919, the knee was, to all intents and purposes, as useful as the other. The writer emphasizes the importance of conservation, and mobilization. W. J. P.

The Operative Treatment of Infantile Paralysis.

Lovett, R. W.: *Surg., Gynec. and Obst.*, Jan., 1921, Vol. 32, P. 20.

An important contribution to orthopædic literature. Dr. Lovett's formulæ is that any patient of average intelligence with flaccid paralysis of the lower extremities, abdomen and back can be made to walk in some form or other, provided he has one good arm, and one arm good enough to hold or catch. This applies not only to poliomyelitis but to fracture of the spine with total flaccid paralysis. The Soutter operation is recommended for hip contracture, while knee contracture and the equinus deformity can usually be overcome without the use of the knife. Tripod walking is explained. The analysis of a limp is gone into carefully, and that due to gluteus medius and maximus paralysis considered fully. The patient should be examined in the nude condition. The limp due to paralysis of the hip flexor muscles and of the abdominal wall is also discussed. These four factors in causing a limp are often overlooked because not so obvious as is for example a foot deformity. All four types of limp are difficult to remedy by operation, but can be helped by mechanical means.

Dr. Lovett considers that the Whitman operation is being abused, though an admirable operation where operation is necessary. Tendon transplanation is a useful and brilliant operation in selected cases; tendon fixation has proved on the whole satisfactory. Silk ligaments have been given up. In a paralyzed arm the minimum acquirements are (1) flexion power of the hand and fingers, and (2) ability to move the scapula on the thorax. Arthrodesis of shoulder and elbow is spoken of favourably. J. A. N.

Critical Comments on a Paper Entitled "Astragalectomy in Paralytic Feet." WHITMAN, ROYAL: *Jour. of Orthopædic Surg.*, Jan., 1920, Vol. 3, p. 18.

THIS is in reply to Dr. Sever's article in the *Journal of the American Medical Association,* October 30th, 1920.

Dr. Whitman points out that the operation was originally designed by him for paralytic calcaneus, often combined with valgus. It is based on pure mechanics, and if it is properly performed, the result, in older subjects, whose tissues are stable, is practically assured. In some cases, especially in children, there is a tendency towards varus. It has been found serviceable in recent years in other forms of paralytic deformity, even equinus. It restores stability of the foot, particularly resistance to dorsal flexion, thus enabling the patient to lock the knee in cases of quadriceps paralysis. Dr. Whitman points out that in 45 per cent. of the cases of calcaneus type reported by Sever failure was complete, and it may be ascribed with certainty to insufficient backward displacement of the foot, *i.e.*, imperfect operative technique. Dr. Whitman infers that the treatment at the Children's Hospital, Boston, leaves much to be desired in connection with this operation. He also states it may be that an operation designed for paralysis of the gastrocnemius is often indicated even when this muscle is active, as in 33 per cent. of Dr. Sever's recorded cases, but such a novel application of the procedure should receive separate analysis. J. A. N.

Pain in the Lower Back. MCCRAE, THOMAS: *The Med. Clin. of North Amer.*, Jan., 1921, Vol. 4, p. 973.

DR. MCCRAE discusses five patients with low back pain. The first case had a sudden onset of pain brought on by stooping and was diagnosed "lumbago" or an inflammatory process of the fibrous tissue in the lumbar fascia.

Case 2 was a spondylitis or fibrositis due to tonsilar infection. The spine in this case showed unevenly restricted movement with negative *x*-ray findings.

Case 3 was due to a spondylitis, the pain of which cleared up under anti-syphilitic medication. In Case 4 the pain was due to sacro-iliac joint disease, apparently non-tuberculous, and in Case 5 prostatic disease caused pain referred to the back.

Dr. McCrae classifies pain in the lower back (excluding acute diseases such as typhoid and smallpox) as follows:

1. Diseases of the nervous system. Meningitis (especially syphilitic) tumours of the meninges, tumours of the cord and cauda equina.
2. Diseases of the spine, spondylitis and perispondylitis, injury, new growth, tuberculosis. Anatomic peculiarities, such as a long transverse process of the last lumbar vertebra.
3. Disease of the muscles and fibrous tissue: fibrositis, "lumbago".
4. Diseases of the pelvic bones.
5. Sacro-iliac joint disease.
6. Diseases of the bowel: carcinoma of the rectum especially.
7. Diseases of the urinary tract: kidney, ureter, bladder, prostate, seminal vesicles and deep urethra in males.
8. Diseases of the pelvic organs in females.

J. A. N.

GENITO-URINARY SURGERY

Carcinoma of the Prostate. BUMPUS, H. C.: *Surg. Gyn. and Obst.*, Jan., 1921, Vol. 32, p. 31.

ATTENTION is called to a need of complete recapitulation of the treatment of carcinoma of the prostate. This has been made necessary by the recent introduction of radium as a therapeutic agent. A careful study is made of three hundred and sixty-two cases of carcinoma of the prostate observed at the Mayo clinic from 1914 to 1919 inclusive.

The lymphatic drainage of the prostate begins by fine capillaries around each glandular acinus and eventually empties into three main groups, internal iliac, external iliac and common iliac, (at the promontory of the sacrum).

Metastasis may occur without giving rise to clinical symptoms and every means must be used to arrive at a diagnosis. Neurological and x-ray examinations are indispensable. In the series of three hundred and sixty-two cases, metastasis was found in 21·8 per cent. In 10 2 per cent. the glands pf the pelvis were involved.

Pain is the most striking symptom. Sciatic pain is the most frequent. Many cases complain of pain in lower back. The explanation of pain is not clear—certainly a great number have pain without metastasis—ninety-four of the total three hundred and sixty-two cases.

Local enlargement of the prostate is not always found, but usually the malignant condition is associated with simple hyperplasia. The relationship of simple hypertrophy to malignant disease is still under discussion, but in nearly every case the malignant change begins in the posterior lobe.

Rectal examination usually reveals an irregularly enlarged stony hard gland. Essentially an infiltrating growth, it spreads upwards into the seminal vesicles beneath Denonvillier's fascia resulting in unicornuate or bicornuate growth. The microscopic picture is an adenocarcinoma.

Radium therapy is more successful in the large type than in the smaller, well encapsulated type.

Bone involvement occurred in 5·1 per cent. of the seventy-nine cases with metastasis, usually in the spine and pelvis. Pulmonary changes are rare and occur late in the disease. Clinical symptoms are varied. Hæmaturia is very rare. Retention is more apt to occur in the large non-metastasis type than the others. Frequency and difficulty were found in more than 50 per cent. of the cases. The urine shows varied changes, but in eighty-seven cases it was found to be normal. The average age of the patients was 64.5.

R. E. P.

A Study of the Spinal Fluid in Fifty-two Cases of Congenital Syphilis.

KINGERY, LYLE B: *Jour Amer Med Asso.*, Jan. 1st, 1921, Vol. 76, p. 12.

ROUTINE tests of the spinal fluids of fifty-two cases of definite prenatal syphilis whose ages varied from three weeks to twenty-one years were made. Deviation from the normal spinal fluid was found in fifteen cases and they are divided into two groups, according to the extent and severity of involvement.

Group 1 included four cases presenting only slight changes and in these the spinal fluid corresponded with slight pathological changes. In Group 2 the more severe types showed grosser changes in spinal fluid, positive Wassermann reactions, pleocytosis and relative increase in albumin and globulin.

Spinal punctures as a routine are urged in these cases because of the value as a diagnostic and prognostic feature and as a guide to intrathecal treatment in cases showing spinal involvement.

A. M. J. T.

An Experimental Study of the Latent Syphilitic as a Carrier.

EBERON, FREDERICK and ENGMAN, MARTIN F.: *Jour. Amer. Med. Asso.*, Jan. 15th, 1921, Vol. 76, p. 160.

IN a series of cases of latent syphilis, rabbits' testes were inoculated with (1) macerated inguinal gland; (2) semen; (3) blood; (4) spinal fluid and (5) nasal washings.

Syphilitic lesions were set up in five rabbits, three from inoculations with inguinal glands and two from semen. Blood, spinal fluid and nasal washings gave negative results.

The incubation period for postive cases varied from fifty-four days to seven months and in each case the spirochæta pallida were definitely recovered and grown through a second generation.

None of the cases used showed any clinical evidence of syphilis, except slightly positive Wassermann reactions. Two cases gave a history of syphilis dating back eleven and thirteen years. One case had a negative Wassermann after treatment one year previously and at the time of inoculation had a one plus reaction with cholesterin antigen.

Spirochæta pallida are harboured in an active virulent form for years after syphilitic infection in cases with intermittently negative Wassermann reactions or only slight reaction in cholesterin antigen.

A. M. J. T.

RADIOLOGY

Discernment of Intrathoracic Neoplasms by Aid of Diagnostic Pneumothorax.

FISHBERG, MAURICE: *J.A.M.A.*, Feb. 26th, 1921, p. 581.

THE author proposes to use "diagnostic pneumothorax for the purpose of discernment of intrathoracic neoplasms along the lines of pneumoperitoneum, used in intra-abdominal conditions". He writes, "In cases in which there is no pleural effusion the technic is simple. We employ the usual technic of artificial pneumothorax, injecting several hundred cubic centimeters of nitrogen or air into the pleural cavity, using any of the standard apparatus and a manometer for the purpose. When the lung is collapsed the solid tumour is clearly seen on the plate. In those in whom an effusion has occurred and it is suspected that it is secondary to a neoplasm, the fluid is first withdrawn with a Potain apparatus." This is then replaced with air. When pus is present a pneumothorax needle is used. As much as 1,000 c.c. of air may be allowed to enter, the amount depending on the condition of the patient and the pressure read in the manometer. The injection is always stopped when the positive pressure reaches 10 c.c. of water. Immediately following this the patient is examined fluoroscopically and one or two radiograms made, with the patient in the erect position.

It is not recommended to induce a pneumothorax in cases with aneurysm. J. D. M.

Pneumoperitoneum of the Pelvis. Gynæcological Studies—Preliminary Report.

Van Zwaluwenburg, James G.: and Peterson, Reuben: *Amer. Jour. Roentgenol.*, Jan., 1921, Vol. 8, p. 12.

By perfecting a new technique and assuring greater co-operation between the gynæcologist and the rœntgenologist, the authors have been able to obtain results that give increasingly valuable information to the clinician, and which simplify the x-ray procedure. The outstanding features of their technique are as follows:—

(1) Inflation of the pelvis is carried out by the gynæcologist in his examining room. (2) Carbon dioxide gas is used as being more readily absorbed than oxygen; 1½ to 2 litres is sufficient. (3) The patient is placed in the knee-chest position, being supported on a wooden frame. (4) The x-ray exposure is made with a portable Coolidge unit, duplitized films with screens being used. Additional information may be obtained by taking stereoscopic plates.

Normally, the anterior and posterior pelvic pouches are empty of everything but gas. Pathologically, changes such as adhesions or inflammatory exudate may occupy one or both of the pelvic pouches. The bladder when empty, is scarcely discernible. The broad ligaments appear as narrow linear shadows. The round ligaments are not seen in the normal pelvis. The Fallopian tubes are not to be differentiated from the broad ligament shadows. The shadow of the normal ovary is incorporated in the uterine shadow. Inflammatory changes, fibromata, pregnancy and alteration in axis of the uterus provide features which are of material advantage in diagnosis to the observer conversant with the normal. A. S. K.

An Instrument for the Application of Radium to Tumours of the Bladder.

Woolston, W. H.: *Surg. Gyn and Obst.*, Dec., 1920, Vol. 31, p. 627.

A clip made of a watch spring is attached to a capsule of platinum, silver, or gold, which contains the radium. The arms of the clip cross each other forming a figure-of-eight. To the opposite end of the capsule is attached a strong silk cord or fine wire. The forceps used to attach the capsule to the bladder wall have a hollow cylindrical shaft about fourteen inches long with a hollow obturator. It can be used only through a direct operating cystoscope, or, in the female, through a Kelly cystoscope. When the capsule and clip are drawn into the forceps the closed end of the figure-of-eight is compressed, opening the jaws of the clip. The capsule may be attached above the tumour on the normal mucosa so that it hangs over the growth, or to the tumour itself. Several capsules may be applied at one time. The bladder should be kept distended with five or six ounces of sterile water while the radium remains. When the clip is attached and the cystoscope removed the guide of silk or wire is fastened to the thigh with adhesive until the radium is taken out. J. D. M.

Topical Applications of Radium.

Bowing, H. H.: *Amer. Jour. Roentgenol.*, Dec., 1920, Vol. 7, p. 582.

It is necessary to define "milligram hours" in each case. The amount of radium used, multiplied by hours applied, gives the number of milligram hours. Applying 50 milligrams of radium for twenty hours is not the same as applying 20 milligrams for fifty hours, although the total of milligram hours is the same. The term "erythema dose" represents 1,000 milligram hours of radium delivered to one square inch of skin surface at a distance of one inch filtered through the silver wall of the applicator and 2 mm. of lead. The term "distance screening" indicates that some substance such as cork, wood or gauze has been interposed between the radium and the skin surface overlying the area to be radiated.

Cancer of the breast, primary and secondary sarcoma, Hodgkin's disease, tuberculous adenitis and splenomyelogenous and lymphatic leukemias respond to topical applications of radium and deep *x*-ray therapy. The reader is referred to the article for details of treatment in these conditions.

W. A. W.

ANÆSTHESIA

Synergistic Colonic Anæsthesia. GWATHMEY, JAMES I.: *J.A.M.A.*, Jan, 22nd, 1921, Vol. 76.

THE writer of this article defines synergism as "reciprocal augmentation of the action of one drug by that of another". The effects, he says of two such drugs is not a matter of simple summation of similar pharmacological actions as it is altogether too great.

The late Samuel J. Meltzer is quoted as saying: "When after the administration of a very small amount of ether, insufficient to cause anæsthesia, an inefficient amount of magnesium sulphate is injected intramuscularly, a profound anæsthesia follows, which can be maintained for several hours."

Magnesium sulphate in small amount added to the usual hypodermic of morphine increases its value 50 to 100 per cent. Clinical results at the Presbyterian Hospital, N.Y., showed that:

1. General analgesia could be obtained by morphine and magnesium sulphate alone.
2. With three hypodermic injections of morphine gr. 1-8 and 2 c.c. of magnesium suphate, supplemented by nitrous oxide and oxygen, the latter in much larger proportions than usual, an analgesic state with unconsciousness and complete relaxation was secured, entirely eliminating the use of ether.
3. One-eighth of a grain of morphine by hypodermic injection in 2 c.c. of 25 per cent. solution of magnesium sulphate in water given two hours before operation and repeated at half-hourly intervals is sufficient to reduce the amount of ether heretofore used in oil ether colonic anæsthesia by one half.

W. B. H.

Intratracheal Insufflation of Ether in Operations which involve Bleeding into the Air Passages. SHIPWAY, T. E.: *Amer. Jour. Surg.*, Jan., 1921.

THIS paper is based on an experience of four hundred and seven cases. They included: (1) Gun shot wounds of the face, mouth and pharynx. (2) Non-malignant disease of the mouth and pharynx. (3) Malignant disease of the mouth and pharynx.

Class 3 is divided into (a) cases in which the glands were removed at the same time as the primary growth, and (b) cases where the primary growth alone was removed.

The writer claims that this method is not followed by aspiration or septic pneumonia even in the most septic mouths. He had six cases of acute bronchitis afterwards, but these patients were emphysematous or had chronic bronchitis at the time of the operation. There were no cases of pneumonia following the operation.

He emphasizes the usefulness of this method in old patients with impaired cardio-vascular systems.

W. B. H.

MEDICINE

Leukæmia: Type Diagnosis by Oxydase Method of Blood Staining. LAMBRIGHT, GEORGE L.: *Amer. J. M. Sc.*, Feb., 1921.

THE writer gives a short account of this method for the differentiation of lymphocytes and cells of the bone marrow. The reaction is described and the formulæ of the solutions and the directions for using are given. The method is simple and the results are said to be very satisfactory.

To anyone who does differential white blood counts, any method which will assist him in placing in their proper classes those indefinite transitional cells, large lymphocytes or large mononuclear cells, is well worthy of consideration.

R. H. M. H.

The Influence of Sugars and Candies on Gastric Secretion. MILLER, RAYMOND J., BERGEIN, OLAF, REHFUSS, MARTIN E., and HAWK, PHILIP B.: From the Laboratory of Physiological Chemistry of Jefferson Medical College, Philadelphia. *Amer. Jour. Physiol.*, Aug., 1920, Vol. 53.

THE widespread use of refined sugars and candies in the diet is a modern development, and the question arises whether such foods are harmful or not. Certain objections such as eating before meals which decreases appetite and consequently the intake of essential foods as proteins, vitamines and salts are evident. The depression of appetite is associated with depression of gastric secretion, which depression is studied in this paper.

It is possible that long continued and excessive use of these foods may lead to diabetes but there is no concrete evidence of this.

Sugars and candies are particularly suited to furnish an easily assimilated supply of energy—a single caramel may furnish forty-five calories, that is sufficient energy for a mile walk—so that they have a definite food value.

This paper is a report of work done to determine the influence of certain sugars and candies on the gastric secretion and gastric motility in normal adults and was carried out on medical students and members of the college staff. The sugar and candies were given on an empty stomach and examinations were made at fifteen minute intervals for free and total acidity, pepsin, trypsin and amino acid nitrogen.

Many different kinds of candies such as hard, soft and chewing, were studied and their effects were noted, and in as much as some candies entered the stomach in a concentrated form, a preliminary investigation of the effects of dilute and concentrated solutions of cane sugar and glucose was worked out.

Cane sugar and glucose were given in 4 and 6 per cent. solutions in amounts to contain about 10 grams of sugar. In these dilutions they were evacuated from the stomach in normal time and the gastric secretion showed no depression (curve given). When maple sugar was used it was found to leave the stomach sooner and without depressing the secretion.

When these same sugars were used in concentrated solution it was found that they remained much longer in the stomach and that the gastric secretion, especially in the case of glucose, was greatly depressed, at least until most of the solution had left the stomach.

When soft candies such as chocolate creams, fudge, bonbons and wafers were given, they entered the stomach quickly and acted as concentrated sugar solutions, that is they depressed both motility and secretion. When actual chocolate was used a more active secretory response was the rule than when such things as the contents of the chocolate creams were used alone. Large quantities of the substance to be tested were used, generally about 100 grams.

Hard candies were tested by getting the subject to suck lemon-flavored stick candy for 15 minutes and weighing the stick before and after. In this way from 7 to 15 grams were swallowed. No water was taken during the experiment so that the sugar was in a moderately concentrated solution in the stomach. In this experiment it was found that the stomach emptied itself in one hour and that a fair amount of acidity was developed, showing that hard candies were less depressing to the gastric functions than the soft kind.

Chewing candies such as caramels, taffy and gum drops were also studied. Caramels caused a marked secretory response, but all left the stomach in about the same time.

The findings of the study were that candies depress secretion and evacuation in porportion to their sugar contents and the amounts ingested. This tendency is influenced by such substances as milk, eggs and chocolate in the confections, which tend to stimulate secretion and so cause differences in the curves.

The work done was quite exhaustive and carefully carried out; the findings are of interest and of considerable practical importance.

R. H. M. H.

A Case of Tricuspid Stenosis. Cotton, Mlle. E. and Saloz, M. C.: *Archives des Maladies du Coeur des Vaisseaux, etc., Paris,* Nov., 1920.

The authors draw attention to the difficulty of diagnosis and cite Futcher's series of one hundred and ninety-seven cases, confirmed by autopsy, in which pulmonary stenosis was the only lesion found in fourteen, and the diagnosis made in life in only eight cases.

The patient reported in the present article was a girl of seventeen years. The main facts in the history were: cyanosis appearing early in life, but not persisting, also frequent attacks of dyspnœa and cyanosis.

The characteristic findings on physical examination were: the cyanotic hue, marked clubbing of fingers, a small regular pulse of 120 per minute, and an enlarged, tender, and pulsating liver associated with throbbing veins in the neck. The heart showed enlargement to the right confirmed by *x*-rays.

There was a transient presystolic thrill and murmur of maximum intensity at the xiphoid cartilage, and at the same area a harsh systolic thrill and murmur.

She died in an acute paroxysm of dyspnœa and cyanosis.

The post-mortem findings were dilatation and hypertrophy of the right auricle and ventricle. The tricuspid valve was in the form of a crevice admitting only the point of thumb, the valve edges being united into a rigid straight membrane. The remainder of heart was normal.

The endocarditis was considered to be of fœtal origin. C. F. M.

Parietal Endocarditis of the Right Auricle. Lutembacher, R.: *Archives des Maladies du Coeur des Vaisseaux et du Sang, Paris*, Nov., 1920.

The author reports the occurrence of such a condition in a man of sixty, who presented much the appearance of a patient with loss of cardiac compensation, venous stasis and general anasarca. However, physical and *x*-ray examinations revealed no valvular lesion or pericarditis. Digitalis and the diuretics had no effect on the ascites which increased. In contrast with the marked venous stasis, acites, enlarged liver, etc., the veins of the neck were not distended, there was no marked dyspnœa, no orthopnœa.

The failure of digitalis, diuretics and salt free diet to make an impression on the œdema, and the addition of signs and symptoms of a pulmonary infarct led to the diagnosis of thrombosis of the right cavity of the heart.

At autopsy there was found a solid fibrinous clot implanted on the wall of the right auricle and partly obliterating the orifice of the inferior vena cava. Heart and vessels were otherwise normal. There was an infarct in the lung.

C. F. M.

DERMATOLOGY

The Herpes-Varicella Infection. Carver, A. E: *Brit. Med. Jour.*, Feb. 12th, 1921.

The writer discusses the question of herpes arising from the same cause as varicella, and also of their being intercommunicable. This connection was apparently first commented on by Bokay, twenty-nine years ago, and since then a large number of cases have been reported, in which varicella has developed in persons associated with cases of herpes zoster. In most of these cases, Dr. Carver points out that the incubation period was that of varicella. He quotes a suggestion made by Dr. Cranston Low in 1919, that the same virus caused both diseases, but that in herpes zoster it spreads from the nose along the lymphatics to the olfactory nerve and cerebro-spinal fluid, while in varicella the infection is blood borne.

Dr. Carver quotes three cases of varicella which developed in three children, in widely separated areas, the infection arising, he suggests, from a case of severe supraorbital herpes, with which the children had all been associated within periods up to twenty days before their illness.

He thinks that the contraction of varicella from herpes occurs only during the period of onset and development of the latter. H. E. M.

NURSING

Care of the Patient Before, During and After Anæsthesia. Sieke, Julia M., R.N., *The American Journal of Nursing*, Jan., 1921, Vol. 21, p. 220.

There ought not to be a routine preparation fo anæsthesia, the patient's temperament, general condition, nature of the operation, anæsthetic used and state of mind all play an important part in recovery. Every patient should receive special consideration and the anæsthetist should look after it. The nurse anæsthetist is handicapped, she is allowed only half the work, it is usually forgotten that she has any interest in the preparation. The nurse who prepares the patient for operation can do a great deal towards his peace of mind.

A hot, cleansing, bed-bath ought to be considered an important feature, if not contra-indicated. Urotropin gr. v. with a glass of water, every four hours for twenty-four hours before operation is valuable, but all preparation as well as after care should be suited to individual need. Specimens of urine should go to the laboratory the morning *before* operation, and the report of the urinalysis should be on hand with the history of the patient, when the anæsthetic is chosen. Preliminary narcotics are advisable, a more complete anæsthesia is thus obtained with less anæsthetic, fear is largely eliminated and post-operative pain diminished, atropin-sulphate gr. 1-150 or 1-200 given with morphia counteracts the depressing effect and dries bronchial secretions.

Metabolism should be kept as normal as possible, the walls of the stomach become irritated after twelve hours without food and the amount of glycogen is diminished; it is claimed that post-operative nausea and vomiting are chiefly due to the disturbances in metabolism. Grue's of barley, rice, oatmeal, etc., may be given up to within three or four hours of operation, unless contraindicated as in intestinal obstruction.

Before beginning the anæsthetic, look over the chart. If patient is old without teeth, place a gauze wedge between the gums. A certain amount of muscular pain may be avoided by a well padded operating table. Patient's head should be covered before leaving the operating room, as it is frequently moist with perspiration and a draft may lead to post-operative colds in the head. When patient is out of ether, four ounces of hot water with sodium bicarbonate gr. v. may be given. After care must differ with the patient, the operation and the anæsthetic used; in routine treatment patients are often starved unnecessarily. M. S.

Bedside Care in Acute Communicable Diseases. Staff Instructors, University Course in Public Health Nursing, Cleveland. *The Public Health Nurse*, Dec., 1920, Vol. 12, p. 978.

THE technique used, calls for a gown, cap, face mask and a supply of paper towels, the nurse leaves her hat and coat in an outer room, folding coat outside out and placing hat on it, she opens her bag in kitchen or bath-room, spreads out paper towels on which soap, brush, and towels are placed after washing her hands, she also spreads on the towels, thermometer, absorbent cotton, alcohol, gown, cap, and large paper bag. Bag is then closed, she put on gown, mask and cap, and rolls up sleeves: first, takes patient's temperature, then wraps thermometer in alcohol pack while giving nursing care ordered by doctor, when this care is finished (including demonstrations of soaking and boiling linen, sterilizing dishes, etc.), the nurse removes mask, scrubs hands and removes gown, exposed side of cap and gown are folded in and both are placed in the large paper bag, which is closed preferably with a label and given to mother to keep unopened until next visit, hands are again washed, thermometer removed from alcohol, washed with soap and water and returned to bag, paper mask and towels are burned. Instruction as to isolation, ventilation, diet, etc., are given to mother and bedside notes written and left for doctor. That the nurse can safely go from one case to another is proved by the fact that for two years this has been our policy and not once has there been transfer of infection. M. S.

Should Instruction in Tuberculous Nursing Be Given During Training? HOUSTON, JOHN WALTER: *The American Journal of Nursing*, Jan., 1921, Vol. 21, p. 217.

AN awakened medical profession is endeavouring through organizations of various kinds to teach the public that tuberculosis is curable and that if intelligent co-operation of the public can be secured the dreaded disease can be blotted out. Is it conceivable that our nurses want no part in this movement. Is it fair to the trained nurse to send her out without any knowledge of the disease which is responsible for one death in ten.

Into the minds of student nurses should be instilled such practical knowledge as shall tend for the same wise treatment as is given other diseases of bacterial origin. There should be no more dread of attending a case of pulmonary tuberculosis than of a septic surgical case. When a nurse objects to caring for a tuberculous patient from fear of contracting the disease, it is evident she has not had proper instruction in her school. With the constant increase in scope of the medical Social Service, there is a broad field for the nurse trained in the specific needs of the tuberculous.

The public health nurse must be technically educated for her work; the doctor is at arms' length from the patients, but the visiting nurse can see what is going on in the home and can get things done. Training should be provided as a part of the general training received in our schools. Provision for affiliation with sanatoriums and hospitals caring for tuberculous patients should be made. M. S.

News Items

ONTARIO

THE PRELIMINARY PROGRAMME FOR THE FORTY-FIRST ANNUAL MEETING OF THE ONTARIO MEDICAL ASSOCIATION TO BE HELD AT THE CLIFTON HOTEL, NIAGARA FALLS, MAY 31st, JUNE 1st, 2nd and 3rd, 1921

GENERAL NOTES REGARDING THE MEETING

The Committee on Arrangements has completed plans for the comfortable accommodation of all members attending. The Clifton Hotel will accommodate about four hundred persons, and the entire building with its magnificent appointments is being placed at the disposal of the Association.

HOTEL ACCOMMODATION

	Rooms	*Rate*
Clifton Hotel..........	400 to 450	$3.00 up
Trennick Hotel..........	60 to 75	2.00 "
Savoy Hotel...........	40	2.00 "
Lafayette Hotel........	60	2.00 "

Hotels at Niagara Falls, New York

	Rooms	*Rate*
Prospect House..........	300	$3.00 up
Imperial Hotel...........	300	2.50 "
Temperance House.......	300	2.50 "

Please make your reservations as early as possible. By doing so you will greatly relieve the Entertainment Committee at the time of registration, and at the same time assure yourself of the accommodation desired.

The Canadian Society of Anæsthetists, the Interstate Association of Anæsthetists of America, the Ontario Radiological Society, the Canadian Radiological Society, and the Ontario Hospitals Association, are all holding meetings concurrently with us at the Clifton, which should add considerably to the interest and attraction of the entire session.

For those who propose coming to the meeting by motor, parking arrangements have been provided. The different boulevards in the vicinity of the Clifton and the splendid roads to the nearby cities, provide attractive local tours for motorists.

Golfers will be welcomed by the Niagara Falls Country Club which is less than one-half hour's motor drive from the hotel, along the Lewiston-Niagara Falls boulevard.

The section of Scientific Exhibits promises to be most interesting and instructive. Excellent collections of pathological specimens, wall charts, laboratory equipment, etc., will be under the supervision of Prof. Fitzgerald, of Toronto University. Special demonstrations will be put on at convenient hours and intervals.

X-ray plates in abundance with a goodly number of view boxes will make it possible for all interested to actively share in this section.

The Committee on Entertainment announces several items of interest; the trip on the famous gorge route, another on the "Maid of the Mist"; visits to the local power plants, and the famous Shredded Wheat plant at Niagara Falls, New York; a tour on the gigantic canal in course of construction by the Hydro-Electric Power Commission. Of course, the ladies are invited to all these features, and also to the Wednesday evening dinner which is being made semi-popular for their benefit. The Thursday evening dinner has been set apart for class reunions, a special programme of a cheery get-together nature following. A musicale has been especially arranged for the ladies for Thursday evening. Not a dull moment during the convention is the slogan of the Entertainment Committee.

Mail, telegrams and long distance messages should be addressed in care of the Secretary of the Ontario Medical Association, the Clifton Hotel, Niagara Falls, Canada. A special clerk will be on hand to take care of all communications.

Dress. Informal dress on all occasions.

As will be observed, the various sections have prepared an excellent collection of valuable papers and subjects for discussion. If, after reviewing these, however, any member of the Association considers that he has any valuable work which he would like to present at the meeting, undoubtedly an opportunity would be made available should such an one immediately put himself in touch with the officers of the particular section in which participation is desired.

The committee wishes to draw the attention of the members to the fact that we have been promised the assistance of several of our distinguished graduates of Canadian universities who have made reputations for themselves and their alma maters, although they are at present residing across the imaginary line.

The committee is particularly desirous that each member present should assume some responsibility in the discussion of one or more of the papers. Discussion to be truly successful, should be general and spontaneous. If you feel that you are too bashful to listen to your own voice at a sectional meeting, send up in writing to the chairman of the section any questions bearing on the subject, which you wish answered.

TIME—STANDARD OR DAYLIGHT SAVING

The meeting will be run on the time being used at date of meeting in Niagara Falls, probably Daylight Saving. Watch for announcements.

TORONTO TO THE FALLS

The Cayuga (Canada Steamship Lines), will leave Yonge St. wharf at 7.30 a.m. Arrival at Clifton Hotel 10.30 a.m.

PROGRAMME

(All Meetings held in the Clifton Hotel)

Tuesday, May 31st

11.30 a.m.—Accepting our Articles of Incorporation.

12.30 p.m.—Luncheon.

2.00 p.m.—Meeting of the Committee on General Purposes.

6.30 p.m.—Dinner (to be followed by a round table discussion). Speaker of the evening, Mr. Tom Moore, President of the Trades and Labour Congress of Canada. The report of the Committee on Interrelations of the Medical Profession and the Public will be another interesting feature of this session.

Wednesday, June 1st

9.00 a.m.—Business Session—the Association.

11.00 a.m.—Address: Some Problems of Hospitalization. Dr. M. MacEachern, Vancouver.

11.45 a.m.—Address: Diet in Relation to Dental Disease (Illustrated). Dr. Wallace Seccombe, Professor of Preventive Dentistry, Royal College of Dental Surgeons.

1.00 p.m.—Luncheon.

2.00 p.m.—Sectional meetings.

7.00 p.m.—Dinner (Ladies invited).
Addresses: The President. Dr. J. Heurner Mullin,
Dr. Charles White, Pittsburgh;
Dr. J. A. Amyot, Ottawa.

Thursday, June 2nd

9.00 a.m.—Sectional meetings.

11.30 a.m.—Address in Surgery. Dr. E. Starr Judd.

1.00 p.m.—Luncheon.

2.00 p.m.—Sectional meetings.

7.00 p.m.—Dinner (Class Reunions).
Address: Dr. Harvey Gaylord, Buffalo.
Followed by a cheery get-together programme.

Friday, June 3rd

9.00 a.m.—Sectional meetings.

11.30 a.m.—Address in Medicine: Dr. Frank Billings.

1.00 p.m.—Luncheon.

2.00 p.m.—Sectional meetings.

SECTIONAL PROGRAMME

EYE, EAR, NOSE AND THROAT

Wednesday, 2.00 p.m.

Experimental Studies of the Vitreous Body. Dr. Park Lewis, Buffalo.

Cataract Extraction Within the Capsule. Lieut.-Col. H. Smith, I.M.S., London, England.

Technique of Cataract Extraction. Dr. Colin Campbell, Toronto.

Thursday, 9.00 a.m.

Strabismus. Dr. E. Roger Wells, Toronto.

Eye Conditions in Pregnancy. Dr. Charles Graef, New York.

Thursday, 2.00 p.m.

Tracheotomy vs. Intubation in General Practice. Dr. J. M. Rogers, Ingersoll.

Gas-Oxygen C. E. Combination for Nose and Throat Surgery. Dr. H. E. G. Boyle, London, England.

Friday, 9.00 a.m.

A Consideration of the Pathology and Treatment of Chronic Catarrhal Deafness. Dr. Perry Goldsmith, Toronto.

The Sinuses. Dr. Duncan McPherson, New York.

Vague Headaches of Nasal Origin. Dr. S. L. Alexander, Toronto.

MEDICINE

Wednesday, 2.00 p.m.

The Essentials of Our Present Day Knowledge of Diagnosis of Pulmonary Tuberculosis

Report submitted by members of the Lænnac Society.

Significance of History.
Constitutional Symptoms.
Physical Signs.
X-Ray.
Special Tests.
Differential Diagnosis.

Address on Tuberculosis (by invitation). Dr. J. C. Pritchard, Battle Creek, Mich.

Thursday, 9.00 a.m.

Symposium on Diabetes

Methods of Study. Dr. J. J. R. McLeod, Professor of Physiology, Toronto University.

Principles of Treatment. Dr. Walter R. Campbell, Pathological Department, Toronto General Hospital.

Prevention and Treatment of Complications. Dr. John R. Williams, Rochester, N.Y.

General Observations. Dr. W. T. Connell, Professor of Medicine, Queen's University, Kingston.

Thursday, 2.00 p.m.

Symposium on Pneumonia

Ætiology and Pathology. Dr. James Miller, Professor of Pathology, Queen's University, Kingston.

Atypical Clinical Types. Dr. Arthur A. Small, Chicago.

Treatment with Special Reference to the use of Serum. Dr. Campbell P. Howard, Professor of Medicine, University of Iowa.

General Observations. Dr. Duncan Graham, Professor of Medicine, Toronto University.

Friday, 9.00 a.m.

The Effects of Anæsthetics on the Liver. Dr. F. H. McMechan, Avon Lake, Ohio.

Food Stuffs. Dr. J. W. Crane, Department of Pharmacology, Western University, London.

General Survey of the Nephritis Problem. Dr. Leonard G. Rowntree, Mayo Clinic, Rochester, Minn.

Friday, 2.00 p.m.

Joint Session with Section of Surgery

OBSTETRICS AND GYNÆCOLOGY

Wednesday, 2.00 p.m.

The Physiology of the Newborn. Dr. Poirier, St. Catharines.

Exsanguination and Blood Transfusion in Septicæmia in the Child with Special Reference to Erysipelas and Blood Infections. Dr. Bruce Robertson, Toronto.

Subject to be announced. Dr. Bell, Toronto.

Thursday, 9.00 a.m.

Ergot and Pituitrin. Dr. A. H. Wright, Toronto.

My Method of Performing Version. Dr. Irving Potter, Buffalo.

Fifty Years of Obstetrical Experiences. Dr. W. T. Harrison, Keene, Ont.

Pyelitis in Pregnancy and the Puerperium. Dr. C. J. Currie, Toronto.

Thursday, 2.00 p.m.

Joint Section with the Section on Surgery. Symposium on Acute Pelvic Inflammation. Dr. E. K. Cullen, Detroit, and Dr. Lothrop, Buffalo.

Friday, 9.00 a.m.

Considerations regarding the Surgical Treatment of Malpositions of the Uterus. Dr. Chas. Gilmour, Toronto.

Prolapse of the Ureter. Dr. Hutchinson, Ottawa.

SURGERY

Wednesday, 2.00 p.m.

The Value of Expert Anæsthesia to all Concerned. Dr. Samuel Johnson, Toronto.

The Use of Living Sutures in the Treatment of Hernia. Dr. W. E. Gallie, Toronto; Dr. A. B. LeMesurier, Toronto.

Postoperative Pulmonary Complications. Dr. H. Ryerson Decker, Pittsburg, Pa.

The Treatment of Irreparable Nerve Lesions. Dr. R. I. Harris, Toronto.

Thursday, 9.00 a.m.

ACUTE PELVIC INFLAMMATION

Symptoms. Dr. Ernest Cullen, Detroit.

Diagnosis and Prognosis. Dr. Lothrop, Buffalo, N.Y.

Treatment. Dr. E. R. Secord, Brantford, Ont.

The Pathology and Treatment of Chronic Brain Injuries, with a View to Determining the Safe Operative Period (Illustrated). Dr. Wm. Sharp, New York City.

Carcinoma of the Prostate: Its Clinical Aspect. Dr. James C. McClelland, Toronto.

Thursday, 2.00 p.m.

Adenoma of the Thyroid Gland. Dr. C. W. Webb, Clifton Springs, N.Y.

Clinical Uses of Basal Metabolism in the Study of the Thyroid. Dr. Kenneth McGregor, Hamilton

Tumours of the Breast. Dr. F. Buntz, Cleveland, Ohio.

The Evolution of Surgery as I Have Seen it in My Own Practice. Dr. A. Groves, Fergus.

The Acidosis Condition. Dr. W. H. Porter, New York City.

Friday, 9.00 a.m.

Atony of the Cæcum verses Chronic Appendix. Dr. Roscoe Graham, Toronto.

Carcinoma of the Colon and Rectum. Dr. Austin, Professor of Surgery, Queen's University, Kingston.

Diseases of the Biliary Tract. Dr. E. Stanley Ryerson, Toronto.

Hour Glass Stomach with Report of Cases. Dr. A. Moir, Peterborough.

The Acute Appendix. Dr. William Jamieson, Hamilton.

Friday, 2.00 p.m.

SYMPOSIUM ON GASTRIC AND DUODENAL ULCER

Ætiology and Diagnosis. Dr. Martin E. Rehfuss, Philadelphia.

X-Ray Diagnosis. Dr. L. R. Hess, Hamilton.

Medical Treatment. Dr. Sippy, Chicago.

Surgical Treatment. Dr. John B. Deaver, Philadelphia.

X-RAY

Tuesday, May 31st

3.00 p.m.—Business Sessions of the Ontario and Canadian Radiological Societies.

7.00 p.m.—Dinner with the Ontario Medical Association and Round Table Discussion.

Wednesday, June 1st

9.00 a.m.—Dark Room Technique. Willard B. Hodgson, Eastman Kodak Co., Rochester, N.Y.

9.45 a.m.—Spina Bifida Occulta. Dr. Chas. B. Sutherland, Mayo Clinic.

10.30 a.m.—Chronic Appendicitis Associated with Cæcal Atony. Dr. Harold M. Tovell, Toronto.

Afternoon Session will be a Symposium on Therapy.

2.00 p.m.—X-Ray Therapy of Tonsils. Dr. John Reemer, New York.

3.00 p.m.—Deep Therapy. Drs. L. Pariseau, Montreal, and G. E. Richards, Toronto.

4.00 p.m.—Radium Therapy. Dr. W. H. B. Aikens, Toronto.

Thursday programme, which is being arranged by the Canadian Radiological Society, will be announced at a later date.

NOTICE

1. Under the supervision of Dr. Chas. B. Sutherland, a large lantern slide exhibition will be forwarded from the Mayo Clinic which ought to be of extreme interest to those doing radiological work.

2. All are cordially invited to forward plates or slides for exhibition purposes. Ample illuminating boxes will be provided for this purpose.

Thursday, June 2nd, 1921, has been set apart as class reunion day at the annual meeting of the Ontario Medical Association which takes place May 31st, June 1st, 2nd and 3rd, 1921, at the Clifton House, Niagara Falls. Special accommodation will be given all classes desiring to dine together on that occasion, and the evening programme promises to be one of a real get-together nature. Classes planning reunions are requested to get in touch with Dr. E. T. Kellam, of Niagara Falls, chairman of the Entertainment Committee.

Class 1911, University of Toronto, decided at the last annual meeting of the Association to hold a grand reunion this year. Arrangements have been placed in the hands of an energetic committee of which Dr. W. M. Cody, 56 South Wentworth St., Hamilton, is secretary-treasurer. Every member of the class is urgently invited to make a special effort to be present, and to advise the secretary-treasurer accordingly. All who started out with the class, but who, for any reason, graduated at a later date, will be welcomed to this reunion.

The Executive Committee of the Ontario Medical Association was engaged on Thursday, April 7th, with possibly one of the busiest and most important day's work which it has ever undertaken when, in addition to a great deal of routine business, four important conferences were held with:

The Executive Committee of the Council of the College of Physicians and Surgeons of Ontario;

The Workmen's Compensation Board;

The Ontario License Commissioners;

The Canadian Life Officers Association.

From the point of view of our Association, each conference proved highly successful. At the conference with the College of Physicians and Surgeons, a Joint Advisory Committee consisting of six members was appointed as follows: from the Council of the College of Physicians and Surgeons, Drs. E. E. King (Toronto), J. Fenton Argue (Ottawa), and G. M. Brodie (Woodstock); from the Ontario Medical Association, Drs. G. S. Cameron (Peterborough), Geo. S. Burt (Owen Sound), and T. C. Routley (Toronto). Dr. King was elected chairman, and Dr. Routley, secretary. The duty of the committee is to obtain all available information on matters of professional and public interest, and to advise both the College and the Ontario Medical Association as to the action which should be taken from time to time.

The Workmen's Compensation Board the License Commissioners and the Canadian Life Officers' Association, all gave us cordial receptions and sympathetic hearings, and it was felt by the Executive Committee that a better understanding conducive to closer co-operation with each of the bodies would undoubtedly follow.

A complete report of the conferences will be available at the time of the annual meeting.

The committee on Interrelations of the Medical Profession and the Public, held a very successful meeting in London on April 2nd, under the chairmanship of Dr. H. W. Hill. Eighteen members of the profession attended from various parts of the province, while the committee was honoured by the presence of Prof. Gilbert Jackson, of Toronto University, who greatly delighted all present not only with his talk on general social conditions, but by his participation in the discussions of the day. This committee promises to bring in an interesting report at the Niagara meeting.

In this issue will be found the preliminary programme for the Forty-First Annual Meeting of the Ontario Medical Association. That no effort has been spared on the part of the committees in charge to make this meeting one huge success, will be evident to all readers.

Scenic Niagara Falls is particularly inviting in the first week of June, and offers a splendid opportunity for a few days' holiday. The scientific programme will certainly interest the profession. The committee on Entertainment is making special arrangements to take care of the ladies. A record attendance is anticipated. Make your reservations early.

The Canadian Society of Anæsthetists, the Interstate Association of Anæsthetists and the New York Society of Anæsthetists will hold a joint meeting at The Clifton, Niagara Falls, Canada, June 1st to 3rd, in conjunction with the meeting of the Ontario Medical Association.

The following papers and speakers are scheduled for the Scientific Sessions:

The Value of Expert Anæsthesia to all Concerned. (Chairman's Address Canadian and Interstate Anæsthetists) Samuel Johnston, M.D., Toronto, Canada.

Anæsthesia—Its Place in the Practice of Medicine. (Chairman's Address, New York Anæsthetists) John J. Buettner, M.D., Syracuse, N.Y.

The Medical Profession and the Nurse Anæsthetist. Wm. B. Howell, M.D., Montreal, Canada.

Charting the Signs and Symptoms of Anæsthesia for Teaching Purposes. A. E. Peebles, D.D.S., Wilmington, Ohio.

Lessons from Anæsthetic Accidents and Near Fatalities. R. M. Waters, M.D., Sioux City, Iowa.

A Consideration of Ethyl Chloride Anæsthesia. Wm. Webster, M.D., Winnipeg, Canada.

A Classification of Anæsthetic Signs and Cardio-Vascular Effects of Ethyl Chloride in Anæsthetic Dosage in Man. Arthur E. Guedel, M.D., Minneapolis, Minn.

The Influence of General Anæsthetics on the Liver. Charles La Rocque, M.D., Montreal, Canada.

Symposium on Anæsthesia in Relation to the Circulatory System.

Clinical Observations on the Effects of Operation and Anæsthesia on Blood Pressure. C. J. Wells, M.D., Syracuse, N.Y.

Clinical Studies in Circulatory Depression. E. I. McKesson, M.D., Toledo, Ohio.

Circulatory and Other Reflexes under Various Ether Tensions. E. A. Tyler, M.D., Philadelphia Pa.

Blood Pressure Reactions under Ether Oil Colonic Anæsthesia. G. M. Geldert, M.D., Ottawa, Canada.

Clinical Studies on the Effects of Variable Nitrous Oxid-Oxygen Administration on Blood Pressure and Some Considerations of Re-breathing in Prolonged Anæsthesia. Geo. W. Tong, M.D., Brooklyn, N.Y.

The Cardiac Reserve in Fibroid Operations. T. D. Buchanan, M.D., New York City.

Symposium on the Relation of Oxygen and Acidosis to Anæsthesia.

Oxygen in Relation to Anoxæmia and Anæsthesia. R. D. Rudolf, M.D., and Thos. R. Hanley, M.D., Toronto, Canada.

A Preliminary Report on Experimental Work in Oxygen Tension during Anæsthesia. Mary E. Botsford, M.D., San Francisco, Cal.

Further Clinical Studies in Oxygen Need during Anæsthesia. W. I. Jones, D.D.S., Columbus, Ohio.

The Value of Ether-Oxygen and Sodium Bicarbonate in the Surgical Procedure. Elizabeth S. Tibbits, M.D., Cumberland, Md.

The Acidosis Condition. Wm. H. Porter, M.D., New York City.

Tissue Acidosis versus Blood Acidosis. W. H. Mercur, M.D., Pittsburgh, Pa.

Acidosis in Relation to Operations and Anæsthesia. Edith M. Ross, M.D., Winnipeg, Canada.

Rebreathing and Etherization. J. R. McCurdy, M.D., Pittsburgh, Pa.

The following papers are under consideration for presentation before the Surgical, Eye, Ear, Nose and Throat and the Obstetrical Sections of the Ontario Medical Association:

The Pathology and Treatment of Chronic Brain Injuries with a View to Determining the Safest Operative Period. Wm. Sharpe, M.D., New York City.

Anæsthesia for Brain Tumour Operations. C. T. W. Hirsch, M.D., London, England.

Synergistic Analgesia. J. T. Gwathmey, M. D., New York City.

Post-operative Complications of the Respiratory Tract. H. R. Decker, M.D., Pittsburgh, Pa.

Anæsthesia for Nose, Throat and Head Surgery by the Nitrous Oxid-Oxygen C. E. Combination. H. E. G. Boyle, M.R.C.S., London, England. (Official representative of the Anæsthetic Section of the Royal Society of Medicine).

Obstetrical Mortality and Morbidity in Relation to Anæsthesia. Wesley Bourne, M.D., and W. J. Duncan, M.D., Montreal, Canada.

Symposium on Methods of Anæsthesia.

Anæsthesia from the Surgeon's Viewpoint. Edgar McGuire, M.D., Buffalo, N.Y.

Experimental and Clinical Observations on Cotton Process Ether. Paul Cassidy, D.D.S., Cincinnati, Ohio.

Pressure in Relation to More Efficient Anæsthesia. Ben Morgan, M.D., Chicago, Ill.

Nitrous Oxid-Oxygen Anæsthesia for Tonsil Operations. John H. Evans, M.D., Buffalo, N.Y.

Handling the Toxic Thyroid under Ether-Oil Colonic Anæsthesia. G. K. Dickinson, M.D., Jersey City, N.J.

Intratracheal Anæsthesia. Wm. G. Hepburn, M.D., Montreal, Canada.

An entire Scientific Session of the meeting will be devoted to Case Reports of unusual incidents under anæsthesia.

The Annual Dinner of the several societies will be served at The Clifton on the evening of June 2nd, at 7 o'clock.

For further information kindly address,

Wesley Bourne, M.D., *Secretary*
34 St. Mark St., Montreal, Canada.

The Western Ontario Academy of Medicine held its fifth general meeting of the 1920-21 session on March 25th, at the Y. M. C. A. auditorium before a large audience of physicians of London and Western Ontario, students of the Western University and graduate nurses.

Dr. Angus McLean, Professor of Surgery of Detroit College of Medicine, gave an interesting talk on, "Ulcer and Cancer of the Stomach Duodenum and Pylorus"—outlining the symptomatology and prognosis of each condition. In treatment he emphasized the desirability of the use of absorbable material in the suturing of the wall of stomach in either excision or in anastomosis.

Dr. Thomas S. Cullen, Professor of Gynæcology of Johns Hopkins, read a paper on, "The Weak Spot in American Surgery"—and pointed out the great need of a thorough pathological training in the evolution of the surgeon, thus securing to him the "binocular · view" of clinician and pathologist in diagnosis. He also demonstrated several methods of dealing with difficulties arising in operations for the various hernia operations. This paper is to appear shortly in one of the surgical journals. Dr. Ernest Cullen, Professor of Gynæcology of Detroit College, discussed the paper at some length.

In the meetings of the autumn session of 1920, clinics or demonstrations were given by the following:

Dr. Pratten and staff at the Queen Alexandra Sanatorium; Dr. F. Kelly, Detroit; Dr. E. R. Le Count, Chicago; Dr. Hoover of Cleveland; Dr. Stockton o Buffalo; Dr. R. Wilder of the Mayo Clinic; Drs. Risden and B. P. Watson of Toronto; in addition to extemporarily arranged meetings addressed by Drs. Service and Birks o China; Dr. Grenfell of Labrador and Dr. Clarke of Toronto.

The programme for the winter session was furnished locally by monthly meetings of the Journal Club, when current topics were epitomized and discussed and by the Clinical Society, where the staff of Victoria Hospital presented cases in conference.

The meeting on April 20th was held in the auditorium of the New Medical College and was addressed by Dr. J. T. Case of Battle Creek and Dr. W. T. Connell of Kingston.

At the last meeting on May 24th, the Alumni of the Western University will convene, and Drs. John B. Deaver, Philadelphia, Dr. Bernard Sippi of Chicago, Dr. Eusterman of the Mayo Clinic, and Dr. Harvey Gaylord of Buffalo will furnish the programme. During the three days preceding a continuous programme of demonstrations and clinics will be furnished by the local profession in the various hospitals and laboratories of the Institute of Public Health, and in the New Medical College. These demonstrations are arranged as a part of Convocation Week programme of the Western University.

There will be a re-union and dinner of the members of '08, University of Toronto, at the meeting of the Ontario Medical Association on Thursday, June 2nd, at Niagara Falls, Ontario. Any further information may be obtained from Dr. J. B. Brown, 131 Oakwood Ave., Toronto.

BRITISH COLUMBIA

During the present session of the British Columbia Legislature, several Bills have been presented by various cults, seeking legal recognition for the right to treat disease.

The Bills are as follows:

1. A Bill to license Optometrists.
2. A Bill to license Drugless Healers, under which are classed Food Specialists, Kinesiologists, Sanipractors, etc.
3. A Bill to license Chiropractors.

The medical profession cannot remain indifferent to Bills which affect so vitally the practice of medicine and the public interest, although it regrets extremely that from time to time, because of the attempts of these cults to obtain recognition, it would seem to be placed on the defensive, a position which is invariably misunderstood by a large section of the public.

To make the position of the profession quite clear, a committee appeared before a Select Committee of the Legislature to which the while question of these Bills had been referred, and stated the position of the medical profession which was briefly:—

That before any man or woman should obtain legal recognition to treat the sick, a certain standard o scientific education should be insisted upon. In other words, that nobody should be allowed to treat the sick unless, before some competent authority, he or she proved their ability to recognize disease.

After all, one of the chief duties of the Legislature is to pass laws for the protection of the Public, and it is difficult to understand how this principle can be ignored in a matter so serious as the safeguarding of the public health.

The Legislature has accorded the Optometrists recognition and a special Bill will be framed to meet their requirements. The other irregular practitioners will be required to conform to the Medical Acts and pass examinations on the subjects which will indicate that they have a knowledge of the human body in health and disease, which was the main contention of the medical profession.

Dr. A. B. McCallum of McGill, on his journey to the Orient addressed the Vancouver Medical Association on "Vitamines". He was also tendered a dinner by the Association which was largely attended.

ALBERTA

The Alberta Medical Association sends us the following report on the re-organization of the profession in that province:

The Associate Secretary of the Association was instructed to visit every medical man in the province and get him to sign a membership card which involved an obligation on the part of the signer to do all in his power for the benefit of his patients, to keep himself up-to-date, to abide by the action of his Executive Committee, and to agree to stand by his confreres for the protection of their rights and privileges in the province.

The Secretary was to gather information and suggestions from every man with whom he came in contact regarding improvement of conditions affecting both the profession and the public; though these suggestions might involve any or all organizations having jurisdiction in the province. Before this canvass was undertaken the Association never had 25 per cent. of the medical profession in the province on its membership roll. At present it has about 80 per cent. The fee was raised from $5.00 to $20.00 and this amount includes membership in the Canadian Medical Association with subscription to the Journal.

The Secretary undertook to organize the District Associations and prepare for interchange of speakers between the city and the country, in order that the men might get closer together socially and professionally.

While the organization is still incomplete, the matter of fees has been taken up with the Compensation Board and a satisfactory arrangement has been reached. The net advance averages between 30 per cent. and 40 per cent. according to the work done. In some cases, however, the advance is 150 per cent. In addition a very friendly relationship has been established between the Compensation Board and our Association, so that the door is always open to any further suggestions.

The question of fees for reporting vital statistics and infectious diseases has been taken up with the Governmental authorities and a favourable decision is expected.

The Association has gone on record as favouring a definite fee for Medical Health Officers for various incorporated towns, villages and municipalities on the basis of population, and expects to get this established. At the present time a great many medical men are acting as M.H.O. for little or nothing, besides carrying all the responsibility and getting all the abuse that is involved.

Negotiations are under way with the Government for a readjustment of fees for medical men as coroners, as expert witnesses in the courts, and for post-mortem examinations. The Government is very favourable to our contention and expects to make a change at the next session of the House.

We are now dealing with the question of contract practice under the Compensation Act when a request is made that all future contracts, commencing January 1st next, embody an agreement on behalf of the doctor that he will care for all patients as regards transportation, hospital accommodation and medical services until the patient gets better or dies, regardless of the fact that his contract may cease the day after the patient may come to him; further an enlargement of the Compensation Act to take in medical aid in case of sickness to the workman as well as his entire family as demanded by the Alberta Federation of Labour.

A clearing house has been established in the office of the Association for locating doctors, selling practices, reducing the congestion of doctors in the cities and helping to distribute them among the good locations in the country where doctors are needed. In addition we are planning for clinic weeks by outstanding men, in order that doctors may not have to leave the province to get post-graduate work. At present the question of establishing two Governmental free diagnostic clinics where a thorough diagnosis can be made and be available to every citizen is being considered in the province, the clinic, however, doing no treatment whatever.

The question of licensing chiropractors has been taken up with the Government and the Senate of the University and the principle has been established that chiropractors must take the same examination as medical men in the basic sciences.

The establishment of two doctors' collection agencies is contemplated in Calgary and Edmonton for the collection of accounts and for making financial reports on the standing of patients. Arrangements are being made with the optometrists for the presentation and the passing of an Act for the protection of the public against imposters.

By means of the press we are arranging to inform the public on the advancement of medical science and giving health talks of various kinds. The public is entitled to information on many subjects that are common knowledge to the profession and of which it knows absolutely nothing. In short the Association is doing everything under its re-organization by helpful contact with the Department of Health, both local and at Ottawa, and with the other departments of the Government as well as United Labour and the United Farmers for the improvement of conditions both for the public and the profession.

NOVA SCOTIA

A CLUB for the study of the History of Medicine through the activities of Dr. A. G. Nicholls, Professor of Pathology. Its membership is restricted to such medical men as are interested in the study of medical history whether they are members of the University or not. At present there are about twelve members in the club which has been called appropriately, "The Osler Club."

It is to meet once a month throughout the session. Already two papers have been communicated, one by Prof. Nicholls on "The Life and Work of Thomas Willis, M.D.", the other by Prof. John Cameron of the Chair of Anatomy, on "The Life and Work of John Hunter."

There are one hundred and sixty-three students registered this session in the Faculty of Medicine at Dalhousie University; and fifty-one in the Faculty of Dentistry, or two hundred and fourteen in the two allied Faculties taken together.

There are three hundred and sixty-eight in the Faculties of Arts and Science.

MANITOBA

The Winnipeg Medical Society offers for competition among the medical men registered in Manitoba, who have graduated not earlier than 1914, a prize of $200.00 to be awarded for the best essay on any subject related to the science or art of Medicine; the essay to be in the hands of the Secretary of the Society not later than September 1st, 1921.

The Society reserves the right to withhold the prize unless, in the opinion of the judges to be appointed by the Executive Council of the Society, the essays are of sufficient merit.

A three months' course on the problem and methods of social welfare work has been commenced at the Univeraity of Manitoba. The three divisions, Mental Hygiene, Child Welfare and Economic Conditions of Social Welfare are under the direction of members of the University Faculty assisted by prominent social service workers and members of the staffs of the institutions for mental disease.

During the last half of January a number of cases of so-called epidemic myoclonus multiplex appeared in Winnipeg and a considerable increase in the number of cases of epidemic encephalitis also occurred. The former condition has been characterized by a comparatively sudden onset with symptoms of general infection followed by severe pain in the distribution of peripheral nerves. In the matter of a week or ten days the pains give way to the sharp clonic muscular contractions in the previously painful areas. In most cases there has been little or no evidence of cerebral involvement.

The first of the series of three new buildings for the department of Medicine, University of Manitoba, is nearing completion. It is of concrete and brick construction and is situated in the grounds of the present Medical College. The first floor provides commodious quarters or the departments of bio-chemistry and bacteriology, while the second floor is devoted entirely to the department of physiology. Each division has been carefully planned to meet the needs of the work of the department to which it is to be devoted. Large airy well lighted laboratories and lecture room together with adequate provision for museums, departmental libraries, offices, etc., will go far toward meeting the demand which greatly increased work has engendered.

The Province of Manitoba has embarked on an extensive building programme in connection with the care of the Feeble-Minded and Insane. During the past year the first unit of the school for the feeble-minded was commenced, a colony building was completed, a nurses' home and psychopathic unit commenced at the Hospital for Mental Diseases, Brandon, and a new laundry building supplied at Selkirk. During the present year work will be completed on the two units at Brandon, a psychopathic unit completed at Selkirk and a second building added to the school for the feeble-minded at Portage la Prairie.

A preliminary announcement has been made by the University of Manitoba with regard to a post-graduate course of instruction in medicine, which will commence on April 25th, and concluded on May 14th. Graduates in medicine in any school may attend, and no charge will be made for any of the courses of study in special branches of medicine and surgery. It is stated that attendance may commence and finish at any time, and graduates are privileged to study in whatever course they desire.

Medical Societies

NOTICE OF CHANGE OF MEETING PLACE OF THE CANADIAN RADIOLOGICAL SOCIETY

The Annual Convention of the Canadian Radiological Society will be held this year in conjunction with the meeting of the Ontario Radiological Society at Niagara Falls on May 31st to June 4th, inclusive. Members will please take notice of this change.

An invitation is extended to all members of the profession to be present, as the programme to be presented will justify the time spent.

CHILD WELFARE ACTIVITIES IN CANADA

Nova Scotia. The Nova Scotia Red Cross Society organized, equipped, paid for and operated during the summer of 1920 two distinct and separate "Public Health Caravans", which toured the Province for forty-eight days in accordance with an itinerary which allowed for the performance of clinical work at forty-five centres and for a number of public meetings in the larger centres between clinics. The direct results as far as known in figures are: one hundred and five meetings; thirty-six clinics; eight hundred and sixty chest examinations; one thousand eight hundred and twenty-two dental cases; three hundred addresses; four thousand three hundred and thirty-six patients treated, and three hundred and ninety operations conducted during trip. This Health Demonstration is the most outstanding activity conducted in Canada to date, and shows well what vision and energy can effect.

A modern "Health Centre" has been opened in Halifax by the Massachusetts-Halifax Health Commission, in a building recently vacated by the Canadian Naval Hospital. It is intended that the work of this Centre shall include prenatal, pre-school and school clinics, and school officials will be offered the use of hospital facilities for correcting remediable defects of pupils.

Quebec. The Child Welfare Association of Montreal recently conducted a physical survey of pupils attending the Academy at Ayers Cliff. Some four hundred and ten physical defects were found among seventy pupils examined; no child being found free from some physical defects. Malnutrition was prevalent to the extent of 18.5 per cent. 80 per cent. of cases examined were in immediate need of treatment of teeth, while faulty health habits were prevalent throughout the entire series. The results of the survey bore out the previous findings of impartial observers that the rural school child was less healthy than the average urban pupil. This survey will shortly be published in booklet form, along with the "Eastern Townships Health Drive" of 1920.

The results of a "Social Study along Health lines" of the first one thousand children examined at the Health Clinic of the Canadian Patriotic Fund (Montreal Branch) offers revelation into child health conditions in Montreal. This work has been pronounced the most exhaustive Child Health Study effected in Canada to date.

Ontario. A conference on Child Welfare was held at Ottawa under the auspices of the Federal Health Department during October, 1920. A Council on Child Welfare was formed with Provincial representation on the central Board of Management, to which all nationally organized bodies engaged in child welfare are entitled to epresentation. The Board of Education (Toronto) has recently conducted a weighing and measuring test among children attending four Public schools to determine the prevalence of malnutrition. While the prevalence of malnutrition was unduly present, the public were surprised to find that this condition of physical inferiority was more rampant, not among the poorly housed children, but among those in possession of material requirements, thus confirming results of similar studies made elsewhere.

The Provincial Red Cross Society of Ontario is actively participating in the public health activities of the Provincial Board of Health, by providing Public Health nurses to supplement the already good work undertaken by the Provincial authorities. These Public Health nurses are provided with individual automobiles for rapidity of transportation, etc.

Book Reviews

HOSPITAL AND HEALTH SURVEY OF CLEVELAND, OHIO. A report presented to the Committee on Survey of the Cleveland Hospital Council by HAVEN EMERSON, M.D., Director, and eight collaborators. Copyrighted and published by the Cleveland Hospital Council, 308 Anisfield Building, Cleveland, Ohio. In eleven parts, published as separate volumes at $5.50 plus postage for all or 50c. plus postage each. Part I, Introduction; General Environment; Sanitation, by Dr. Haven Emerson, 90 pages. Part II., Public Health

Services: Private Health Agencies, by Dr. Haven Emerson, 168 pages. Part III., A Programme for Child Health, by Dr. Josephine Baker, 62 pages. Part IV., Tuberculosis, by Dr. Donald B. Armstrong, 60 pages. Part V., Venereal Disease, by Dr. Alex. N. Thompson, 51 pages. Part VI., Mental Diseases and Mental Deficiency, by Dr. T. W. Salmon and Dr. Jesse M. W. Scott, 75 pages. Part VII., Industrial Medical Service: Women and Industry: Children and Industry, by Dr. Wade Wright, 129 pages. Part VIII., Education and Practice in Medicine, Dentistry, Pharmacy, by Dr. Haven Emerson, 59 pages. Part IX., Nursing, by Josephine Goldmark and Anne H. Strong, R.N., with seven collaborators, 105 pages. Part X., Hospitals and Dispensaries, by Michael M. Davis, Jr., Ph.D., 180 pages. Part XI., Method of Survey: Bibliography of Surveys: Index, by Dr. Haven Emerson and Dr. Gertrude E. Sturges, 80 pages.

THE eleven volumes, nearly eleven hundred pages all told, form a regular treatise on the general "public health and sickness" situation, with Cleveland as the subject. The reviewer is tempted to suggest "Medical Chaos and its Cure" as an appropriate title for this monumental work, with its pages of detailed recommendations.

Part eleven, *methods*, should really be read first. The rationale of the survey is nowhere better outlined than in the opening paragraphs—"While all the world is clamouring for production, it is worthy of great praise that a community should determine that, in one place at least, the producer shall rank ahead of the produce in their thoughts and plans." Again, "Property will always have its protectors and promoters. It is persons who are chiefly neglected." This is the keynote of the whole eleven volumes—the slogan of *service to humanity itself* which runs all through the survey.

Part ten, *Hospitals and Dispensaries*, will interest every physician. It estimates 2 to 3 per cent. of the population is ill at any one time, continuously; that five beds per 1,000 of the population is required to care adequately for the sick; and proceeds to outline the organization for a hospital that is not to be merely a "Medical boarding house" but is to give medical service of the highest and most human type. The modern hospital exists, not to treat *disease*, but *humans who are ill.*

Part nine, *Nursing*, amongst many excellent recommendations emphasizes the value of the University providing both undergraduate and graduate training, leading to the Nursing Diploma and also a University degree. Academic training for a year, then practical nursing training with the usual medical subjects for three years, and a post-graduate university course in Institutional or Public Health work for both seems to be the choice arrangement at present. The call to *service* is again addressed to all, clearly and unmistakably here.

Part eight, *Education and Practice in Medicine*, treats of the shortcomings as well as of the successes of the Medical School and of the practising physician, without fear or favour, finding the chief defects in (a) lack on the part of both the profession and the university of real specialism with expert knowledge of the subjects: (b) lack on the part of the university of single-hearted devotion to *teaching* in its broadest sense, rather than to *carrying on* community work; (c) lack on the part of both the profession and the university of using to full advantage the material available; (d) the lack, very familiar everywhere, of unity and co-operation amidst the profession. No more serious or important admonition to the medical profession can be given than the mere story of the situation as here outlined.

Part seven, *Industrial*, as might be expected, deals with the sometimes splendid, but usually quite unenviable, situation of industrial medicine. The recommendations made are far reaching but too voluminous for reproduction. Again the need is for organization, co-operation, construction, corrrelation—not the blind haphazard opportunist situation so far existing.

Part six, *Mental Disease;* Part five, *Venereal Disease;* Part four, *Tuberculosis*, are devoted particularly to the situation of these great causes of social decrepitude as they exist in Cleveland, and form real treatises on these subjects as racial menaces. Pity, 'tis, 'tis true, not only of Cleveland but also almost everywhere—and more often the situation is worse rather than better. The failure of modern medicine, so perfect as a technical service, to function well as a sociological device, is no where better demonstrated than in the consideration of these diseases.

Parts three, two and one, dealing with the *Child, Public and Private Health Agencies*, and the general *sanitary* situation in Cleveland are chiefly interesting in their recognition of the present state of "pure desperation"—and in their optimistic view of the developments which social forces now actively at work are driving towards "onward and upward."

Foolishly perhaps the reviewer dares attempt something which is foredoomed to failure that is to summarize in a few words the vast amount of detailed evidence, careful study, and wealth of recommendation issued in this most timely and valuable report, as follows:

The situation of the race, physically speaking, is deplorable; the privately operating medical profession does not and cannot, as things are, begin to compass the needs; such public agencies as exist are quantitatively quite inadequate to cover the real demands; and it is time for Medicine and all its cohorts to realize the facts and "gird up its loins" to meet them.

(In the United States, private agencies have on a vast scale driven ahead of both the Medical Profession and the Public Services—a huge wave of lay activity, the result of Public Service inertia and of medical limitations imposed by an accepted but mistaken concept of professional ethics. In Canada the field is yet open before us and it is up to the Medical Profession itself to lead the way, instead of waiting until it finds itself dragged unwillingly along the path of its real duty—which is, not old time "practice" but the "physical regeneration of the race.")

H. W. H.

A Guide to Anatomy. For Students of Medical Gymnastics, Massage and Medical Electricity. By Miss E. D. Ewart. Demy 8vo. with xii and 301 pages and 94 illustrations, including 35 plates. Published by H. K. Lewis & Co., Limited, 28 Gower Place, London, W.C. 1. Price, 16/net.

The author in her preface points out that it must be clearly understood that this volume is essentially intended for the class of students indicated, and that it is insufficient as a guide to Anatomy in the complete sense. With this reservation in mind one may say that she has succeeded admirably in presenting a concise summary of the essentials of anatomical knowledge. The illustrations serve their purpose well, and free use has been made of diagrams, which by their simpliciy convey a clear mental impression.

The book should prove to be a mine of knowledge to the lay worker in the field of medical gymnastics, massage and physical reconstruction in general.

E. R. S.

The Endocrines. By Samuel Wyllis Bandler, M.M., F.A.C.S., Professor of Gynæcology in the New York Post-Graduate School and Hospital. Octavo of 488 pages. Philadelphia and London: W. B. Saunders Company, 1920.

In his preface the author states he has drawn from the works of numerous authors who he names. So many of his pages appear to be constructed on the scissors and paste basis, without suggestion of editing, that we have a hodge podge of theories and beliefs which lead us nowhere. There appears to be no attempt to clarify the situation, and our imperfect knowledge of the internal secretions is not in any way enhanced by this work.

We can see no reason for the publication of this book.

J. H. E.

George Miller Sternberg. A Biography. By his wife, Martha L. Sternberg. Price, $5.00. 232 pages with illustrations. Publishers: American Medical Association, 535 North Dearborn Street, Chicago, 1920.

This biography of Major General Sternberg is written by his wife in the hope that the story of his life and work might serve as an inspiration to future generations, and is published by the American Medical Association to place on permanent record the pioneer work in bacteriology and preventive medicine carried on by Dr. Sternberg during the early years of his military service and for the greater part of the time under very inauspicious conditions.

The volume is not only a well written and most interesting account of the personal life of Dr. Sternberg, and his activities during the American Civil War and in several Indian Campaigns in the Western States, but it also tells the story of his earnest and laborious researches into the causes of numerous epidemics of cholera, typhoid fever, malaria and yellow feevr, finally ending in the appointment of the commission that resulted in the discovery of the mode of transmission of yellow fever; a discovery which has resulted in the freeing of so many southern tropical cities from the ravages of this dreaded scourge, and which has rendered possible the building of the Panama Canal.

The American Medical Association is to be congratulated on the publication of this volume. The story told is interesting, instructive and inspiring.

A. D. B.

NOTES ON THE MEDICAL TREATMENT OF DISEASE. For Students and Young Practitioners. By ROBERT DAWSON RUDOLF, O.B.E., M.D. (Edin.), F.R.C.P., professor of therapeutics in the University of Toronto. University of Toronto Press, 1921.

We have much pleasure in commending this small volume on the Medical Treatment of Disease to our readers. Its aim, as stated in the preface, is to impress on the reader the broad principles of the medical treatment of the sick, and to urge the importance of method in dealing with patients. Of great importance is the effort made throughout the volume to impress the physician with the fact that it is more important to treat the patient than to follow any routine treatment of the disease. The fundamentals, however, of the management of disease affecting the various systems, and of the specific infectious diseases are clearly stated, and useful prescriptions are scattered through the book. We can cordially recommend the book both to student and practitioner as a concise statement of the important methods of treatment to be employed in guiding patients through their times of sickness and distress. Valuable chapters are introduced on the Therapeutic Use of Oxygen, the Present Position of Venesection, and on Opotherapy, which will well repay careful perusal. While we confess with the writer that much of our therapy is still empirical, we are also of the opinion that if every physician would give as much thought to studying the exact actions of the drugs he prescribes, and the untoward effects which may be produced by unsuitable doses, as the careful surgeon does to the anatomy of the part on which he is about to operate, more successful results would follow drug therapy. We regret that more frequent reference is not made to the value of hydrotherapy, and greater detail is not given to its method of employment. A. D. B.

INTERNATIONAL CLINICS: Volume IV, Thirtieth Series, 1920. Edited by H. R. M. LANDIS, M.D., with the collaboration of Editors in Canada, Great Britain, Continental Europe and U.S.A. Octavo of 311 pages. Philadelphia and London: J. B. Lippincott Company, 1920. Cloth, $7.75, net.

Dr. Landis with his collaborators continues to keep this publication up to a high standard. The present volume, completing the thirtieth series, after presenting some seven clinical lectures on medical, surgical, and obstetrical subjects, gives a splendid series of papers in the departments of Medicine, Pediatrics, Surgery and Industrial Medicine, in which foreign writers are prominent. Of these we may specially mention F. Parkes Weber, Clemens Von Pirquet, Jean Golay of Geneva, Antonin Benazet and Quintrie-Lamothe. Von Pirquet has been convinced from his experience with children in Vienna that lack of food and poor sanitation are great factors in the production of tuberculosis. By recognition of the principles of proper nutrition, appetite encouraged by plenty of sunshine and fresh air, and the body waste diminished by a regular mode of life, he is satisfied tuberculosis may be restricted and the percentage of mortality reduced to a minimum degree.

Golay's study of the clinical value of the Wassermann reaction is timely and gives a splendid review of recent opinions on the subject in addition to his own deductions.

The article on diabetes insipidus gives an exhaustive bibliography of the subject and points out the relation of the condition to disturbed pituitary function. The authors consider the relation proven and feel the disease should be known as pituitary polyuria and may now be placed in the group of remediable diseases.

The articles in the other departments are of equal value making the volume one which will repay perusal by physician, surgeon, or general practitioner. We heartily recommend it.

J. H. E.

THE COURSE OF OPERATIVE SURGERY. A Handbook for Practitioners and Students. By PROF. DR. VICTOR SCHMEIDEN, Professor of Surgery in the University of Halle, and ARTHUR TURNBULL, M.B., Ch.B., lately demonstrator of Anatomy in the University of Glasgow. Second revised English edition of 350 pages and 436 illustrations. Published by J. F. Hartz Co., Limited, of Toronto. Price, $6.50.

While essentially and primarily this volume is intended as a guide to the study of operative surgery on the cadaver, the authors make a special effort to point out the modifications of the various operations described, which are rendered necessary when it is proposed to carry out these on the living. The material is largely based on the operative work of Professor Bier of Berlin, and as for purposes of compactness, only one or at most two methods of carrying out each individual operation are described, the result is that the operative methods indicated are almost entirely those of the German school, and little or no credit is given to the surgeons of other countries for any improvement in technique.

The authors have succeeded in describing the formal operations of surgery in a very clear and lucid manner, and the illustrations serve their purpose admirably. The section concerning the operations on the abdomen is the best in the book, but to the practical surgeon it would seem that it might have been further amplified and a little less space devoted to the ligation of the main arteries.

Amputation of the lower third of the leg by the long anterior flap is described whereas the long posterior flap has many advantages. No mention is made of the F. Jordan method of disarticulation of the hip, yet in selected cases it would appear to be decidedly the operation of choice.

One can hardly escape a certain sense of disappointment that this edition has not been further revised but follows so closely the text of the edition of 1912. Many of the newer operations are entirely omitted. No mention is made of operative measures for the treatment of fractures, of Pott's disease, or of congenital defects such as club foot, or hare lip.

In the section dealing with the treatment of chronic empyema the Schede operation is described, and no mention of the advantages to be gained by some form of lung decortication is made. The old method of avulsion of the Gasserian ganglion is described with no reference to the advantages of posterior root section. Certain methods for the closure of cranial defects are referred to but the use of a graft of rib cartilage is omitted.

However, while it is true that much has been left out, it is surprising how much ground has been covered, and with few exceptions the methods described are those of good surgical practice and may safely be followed. E. R. S.

A HANDBOOK OF SKIN DISEASES AND THEIR TREATMENT. By ARTHUR WHITFIELD, M.D., Second revised edition. London. Edward Arnold. Price, 18/ net.

IN this work, the commoner diseases of the skin are described in a clear and concise way.

The author has devoted a chapter to the technique of preparing and staining the fungi and bacteria commonly found in skin diseases.

The latest treatment is well reviewed. The illustrations are excellent. D. K. S.

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THE IMPORTANCE OF PRECISE ANATOMICAL KNOWLEDGE IN THE SURGERY OF THE PERIPHERAL NERVES

ALEXANDER GIBSON, M.A., M.B., CH.B., F.R.C.S., F.R.S.E.

THE military activity of the years 1914–1918 forced upon the attention of the surgical members of our profession a number of problems different from those of peace time. Perhaps it is more exact to say that there were few problems of a different character, but there were provided in wholesale measure examples which civil life furnished with a sparing hand. Such problems were those of the treatment of compound fracture of the femur; of acutely infected joints; of dealing with large bone cavities; of mal-united or ununited fractures; of loose or flail joints; of injuries to the peripheral nerves. All of these problems have been attacked with resolution and ingenuity. To some of them an appropriate solution has been found in the case of others we are still groping after an answer. The subject with which we wish to deal more directly to-day is that of lesions of the peripheral nerves. In times of peace all of us have sutured the median nerve at the wrist as an incident in patching up an accidental cut. Some of these cases doubtless did very well, while others obtained varying degrees of recovery, or none. Not everyone of us would take his oath that he had not joined the proximal part of the median to one of the flexor tendons. Be that as it may, nerves were not regarded by the surgeon as being of any more importance than blood-vessels. Experience of war surgery has changed all that. When formerly there were scores of cases, to-day these can be reckoned by the thousand, and much of the air of mystery that surrounded peripheral nerve lesions has been dispelled.

Nerve lesions were always, to some extent, a "terra incognita", and not a little of the hesitation we felt in regard to diagnosis and prognosis, was owing to the misleading information scattered through text-books and systems, and sponsored by great authorities. In point of the surgical treatment we were bidden to observe methods of lateral implantation or of nerve grafting, or of turning down flaps to bridge gaps. You inserted a nerve into a slit in a neighbouring nerve. Further along the uninjured nerve (sensory or motor or mixed, mattered not a jot), you inserted the other loose end of the injured nerve, and then by some mysterious chemiotactic or neurotropic influence, some neural alchemy, a glad reunion occurred and all was well. Or, dealing with a nerve as if it were a mere tendon, you carefully turned down a flap to bridge a gap. Any feat of ingenuity which would accomplish physical or chemiotactic continuity would solve the conundrum. All that is changed and in speaking of nerve surgery one sometimes wonders what there is in the subject to occupy more than five or ten minutes of time. The whole matter can be put in a single sentence. If one can obtain anatomical continuity of the divided fibres without tension one has a right to look for a happy result. If such continuity cannot be obtained without the interposition of scar tissue, or without undue tension, the results will not be favourable. That is all that, to my mind, the subject of nerve surgery holds, anything

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further is simply the application of anatomical knowledge.

I should like to support this position by bringing to your notice some selected cases that have come under my own care, in which the use of a little anatomy proved of service. In the early days, before one had developed a technique for the operation, I had occasion to explore a musculo-spiral nerve just above the bend of the elbow. A friend of my own, who is an assistant surgeon at one of the London hospitals, operated with me. We exposed the musculo-spiral nerve just above the elbow and then with extreme care traced it down through a mass of scar tissue above the elbow until it dipped down between the radius and the ulna in the antecubital fossa. As the work of tracing the strand of tissue became easier I ventured to say that we were on the wrong track, the impossibility of this being upheld by my colleague. He had forgotten that the musculo-spiral nerve, in becoming the posterior interosseous, winds around the outer side of the upper part of the radius through the fibres of the supinator brevis muscle. To-day, in the light of experience, the whole incident bristles with ignorance, but ignorant we were. We had carefully and painstakingly switched from the musculo-spiral nerve, through a strand of fibrous tissue, to the tendon of the biceps. Which of you, in 1915, would have cast a stone at us?

In 1918 I operated on a case for the second time, the first operation having been performed in 1916 by a surgeon who was then writing somewhat freely on the subject of nerve suture. The sciatic was involved in the lower part of the popliteal space. I found that the internal popliteal was sutured to the external popliteal—lower part, and that the upper portion of the external popliteal was sutured to the tendon of the biceps flexor cruris. I do not make any harsh criticism. These were the early days.

Since that time the one outstanding lesson of nerve surgery has been: Make use of your knowledge of normal anatomy. A corollary, or rather a "sine qua non", of this has been the use of long incisions. See what you are doing. If the state of the lesion is such that the condition is irremediable, you have an opportunity to recognize this, and in this way to save a year or more of well intentioned and probably well applied but futile treatment. Your incision may extend from below the elbow joint to above the clavicle; its lower limit may be the popliteal space and its upper the crest of the ilium. That does not matter. Wherever you have to go to obtain free exposure, go. A former teacher of my own used to say that the finest text-book of surgery he knew was the Bible, and I have sometimes thought of this dictum of his when following a tortuous sinus. I have been reminded of the remark made by Ruth to Naomi, "Whither thou goest I will go." In dealing with nerves also, that is the only safe rule.

It would seem a truism that accurate diagnosis should precede treatment. Unfortunately, however, diagnostic accuracy is not always possible, hence the other very sensible surgical maxim, "When in doubt explore." Both positions are of course correct, although when carried to extreme the one course leads to prolonged passivity, the other to precipitate action. The only way open to a surgeon whose pride in the quality of his work keeps ahead of his operating zeal, is to make his pre-operative diagnosis as definite as possible in regard to both the site and extent of the lesion. If surgeons would only realize that from the point of view of professional *amour propre* a rose has fallen from their chaplet just as much when an operation is performed which could and ought to have been avoided if sufficient care had been taken beforehand, as when by procrastination a life is sacrificed or a useful function diminished, it might lead to greater precision of observation in the light of anatomical relationships. In this connection permit me to quote from "Disabilities of the Locomotor Apparatus", by Broca. In speaking of cases where a large part of the muscle mass has been shot away resulting in degeneration of the muscle below this level and consequent abolition of function of the joints controlled by the muscles he says:

"I have seen cases of this sort, however, in which it was proposed to explore and free the main nerves of the limb, a perfectly useless and ridiculous procedure. One of such cases was that of a patient with non-union of the shaft of the radius a little above its middle and with extensive destruction of the flexor and some involvement of the extensor muscles of the forearm: liberation of the muscle having failed to improve the use of the hand, a surgeon actually proposed, after the lapse of a few months, to explore the nerves above the level of the lesion.

Now, this constituted an error of diagnosis that is far from uncommon, although quite easy to avoid, that of mistaking loss of motor power from destruction of muscle for that of an actual paralysis. Such a mistake can be easily avoided by a careful examination of the sensibility and of the movements that can still be carried out below the scar, by looking for the presence of trophic and vascular disturbances, and especially by determining the exact level of the wound and the relation to the points of origin of the motor branches of the nerves to the muscles affected. In the case of the patient to whom I have just alluded, there existed below the scar no sign of any nerve involvement, and the scar itself was obviously well below the point of origin of the motor branches of the median and musculo-spiral nerves to these muscles.

I have dealt with this point at length because on many of the patients' labels I have noticed this obvious error of diagnosis. In these, apparently, the existence of a nerve lesion was all the more believed in because of the electrical reactions of the lower ends of the divided muscles, but of course the reaction of degeneration is to be expected in their lower ends, which, normally almost tendinous, are now sclerosed and degenerated."

In selecting examples to illustrate the importance of anatomy, I propose to cull instances from different parts of the body. Let us commence with the lower limb. Several cases similar to the following have been encountered. Pain is complained of in the region of the medial malleolus. This pain is mainly aching in character. On examination one finds a distinct region of hyperæsthesia between the medial malleolus and the point of the heel, a region corresponding to the distribution of the medial calcanean branch of the tibial nerve. Further, just behind the prominence of the malleolus one can palpate a tender cord, somewhat thicker than it is upon the opposite, presumably normal side. I have explored several of these cases and the findings have been the same in all. The tibial nerve has been found closely invested by and adherent to a thickened sheath. The usual procedure is to dissect the sheath away completely and bury the nerve in the fat which is always present in this locality. The probable explanation is that the nerve has been bruised by being kicked by the heel of the boot on the opposite foot, at least I have been unable to suggest any other explanation. In every case, the operative measure outlined above has led to disappearance of the symptoms.

Perhaps the two most frequently injured of all the peripheral nerves are the radial, or musculospiral, and the ulnar. As a matter of clinical experience it has been found that suture of the musculospiral nerve has a rather better prognosis than that of many other nerves. On the other hand, when suture is attempted of the posterior interosseous, the result has been uniformly disappointing. I am not prepared to say definitely why this is so, but again as a matter of experience one finds that when it is necessary to suture a nerve just above its division into a number of branches, the outlook is not very good. Such is the case for instance when suture of the external popliteal nerve is carried out just above the level of the neck of the fibula before its division into anterior tibial and musculocutaneous portions. In the case of the posterior interosseous, its division into six or seven branches is almost immediate, being completed before the exit of the nerve from the supinator brevis muscle. Indeed the dorsal interosseous nerve is no more than a fine thread which ends on the back of the carpus in a gangliform enlargement from which tiny branches pass to the carpal joints. So definite is one's present opinion on the uselessness of trying to repair a posterior interosseous lesion that one would now waste no time over it. One would immediately perform a tendon transplantation permitting of return to work with a very useful hand in six or eight weeks' time, instead of staking a year or so on the problematical recovery of the extensor muscles after suture of the posterior interosseous.

Pte. W. was operated on on August 28th, 1919, the musculo-spiral nerve being completely lacking in function. At operation the nerve was found embedded in bone at the site of the fracture, about three inches above the elbow joint. After resecting the minimum amount it was found that the ends could not be approximated without some tension. A union was made, with the decision to perform a tendon transplantation at a later date. As there was insufficient evidence of regeneration, a tendon transplantation was done on March 11th, 1920. On April 1st, the retaining plaster was removed, and functional exercises instituted.

Cases of lesion of the ulnar nerve are exceedingly common and are easily recognized as a rule. The attitude of the hand is typical. The ring and little fingers show hypertension at the metacarpo-phalangeal joints and flexion at the interphalangeal joints. This deformity of claw-hand is always more pronounced if the injury to the nerve is below the upper part of the forearm than if it be above the elbow joint. The reason is one of pure anatomy. I have often been asked what is the mechanism of the claw-hand. Three groups of muscles are involved: (1) the extensors of the fingers, (2) the interossei and lumbricals, (3) the flexors of the fingers. Let it be remembered that the function of a muscle is to approximate its attachments, not primarily to flex or extend a joint, and the mechanism is clear.

The extensors are in action, the flexors are in action, the interossei and lumbricals are out of action. The extensors of the fingers are inserted into the common extensor expansion on the dorsum of the first phalanx. It is no part of their function to extend the two terminal phalanges except through the medium of the common extensor expansion.

The lumbricales and interossei act as guy ropes to keep the metacarpo-phalangeal joints in partial flexion, or at least in the straight line, and through their insertion into the extensor expansion, keep the two terminal phalanges in full extension. When their influence in this direction is removed the extensors of the fingers approximate origin and insertion to their utmost and thus hyper-extend the metacarpo-phalangeal joints. The extending influence of the interossei and lumbricale being removed, the flexors of the fingers find themselves confronted with little opposition and thus exaggerate the flexed condition of the two terminal phalanges. But, you may ask, "Even if the flexors of the fingers are out of action why does some degree of flexion occur?" The reason is simply that partial flexion is the natural position assumed by these joints when under no muscular influence whatever. It will now be evident why it is that a low lesion of the ulnar nerve is associated with a greater degree of claw-hand than a high one. In the high lesion the ulnar portion of the flexor profundus digitorum is out of action and this degree of flexion is simply that of natural joint conformation. When the ulnar portion of the flexor profundus digitorium is acting practically unopposed it increases the degree of flexion enormously. It will also be obvious from this reasoning why a patient with a moderate degree of claw-hand from a high ulnar nerve lesion should frequently think his condition is getting worse instead of better after nerve suture. The branch given off by the nerve to the flexor profundus digitorium takes its origin a short distance below the elbow joint, and is thus not infrequently among the earliest branches to show recovery. The disabling factor in an ulnar nerve lesion is essentially the hyperextension at the metacarpo-phalangeal joint. If this be overcome by preventing the first phalanx going backward, almost full extension of the fingers can frequently be carried out. My attention was called to this by a patient with a low ulnar nerve lesion, who wished to play the piano. In an attempt to secure this a splint was devised on the following lines: a light splint of German silver is made to fit the ulnar border of the hand. It extends proximally to just distal to the carpo-metacarpal articulations. Distally it extends to a line just short of the proximal interphalangeal joints of the little and ring fingers. Opposite the metacarpo-phalangeal range it is bent, forming an angle open forwards. From the ulnar border a stouter flange bends round into the palm just proximal to the metacarpal head ending in line with the head of the second metacarpal bone. It is an easy matter to secure this with a tape or a dome fastener, and with the splint in position comparatively little restriction of extension is observed. The splint is exceedingly light and has been, for the most part, much appreciated by those who have used it. Should the lesion involve both median and ulnar nerves it is only necessary to make the dorsal flange sufficiently extensive to cover the four ulnar metacarpo-phalangeal joints.

While we are dealing with the ulnar nerve, another small point comes up for mention. In lesions of the nerve below the elbow one often finds that it would be possible to bridge a gap, provided the nerve could be displaced in front of the elbow joint, but unfortunately we find that two branches come off just below that level; the branch to the flexor carpi ulnaris, and the branch to the flexor profundus digitorium. Now these can be preserved. It is always possible to see them and dissect them free, if one knows they are there and looks for them. Should it be necessary a good deal of additional length can usually be obtained by following the branches into the substance of the corresponding muscle. Moreover one does not hesitate to sacrifice deliberately the ulnar flexor branch if that be essential to obtaining a union without tension.

The case of Pte. G. B. is illustrative of this. The scar of the original lesion is a short distance proximal to the wrist joint. My operation notes under date of October 10th, 1919, are as follows:

"Left ulnar exposed in lower part of forearm. After resection, a gap of four and a half inches was present. The nerve was displaced in front of the internal condyle. The branch to the flexor carpi ulnaris was seen and preserved as was that to flexor profundus digitorum. A fair amount of scar tissue was present in the bed of the union. The elbow and wrist were kept flexed in plaster for six weeks. Stitches were then removed. Partial flexion was maintained for two weeks more. At present date—April 7th, 1920 there is distinct recovery of protopathic sensibility over the former area of anæsthesia and there is tenderness of the hypothenar eminence and the interosseous muscles which is highly suggestive of regeneration."

A very interesting lesion of the ulnar nerve came under my care some time ago, which to my mind is sufficiently rare to merit being recorded. The complaint was of weakness and awkwardness in the left hand. There was no loss of sensation and no atrophy of the thenar or hypothenar eminences. There was, however, some atrophy of the interossei. This was, I believe, a case of pressure neuritis of the ulnar nerve in the palm of the hand. The patient was a butcher, and his work involved skinning over 100 cattle per day. In the process the hide was grasped firmly with the left hand, the fingers, especially the middle and ring fingers, being tightly clenched, while with the right hand the integument was detached from the subjacent soft parts. Since relinquishing this particular form of activity the patient's disability is steadily improving.

Having considered one or two points in relation to the nerves of the upper limb, let us turn for a moment to some examples from the head and neck. Several cases have come under my care, suffering from gunshot wound of the neck, where tenderness was extreme in the area of distribution of some of the cutaneous nerves. These were treated for the most part by resection of the cutaneous branches involved. When it was possible to perform the section at a higher level than the scar tissue it was possible to overcome the subjective pain as well as the tenderness. When that was impossible, relief from tenderness at the cost, it is true, of ordinary sensation was obtained. One of the most striking cases of this character was the following:

Pte. T. E., on March 23rd, 1918, sustained a gunshot wound of the right side of the neck. He presented a rather remarkable appearance. One half of his neck was shaved and clean, the other was unshaven and had not been washed for a long time. The tenderness was extreme. He could not bear the slightest touch over an area extending over the right mastoid process and adjacent part of the scalp forward to the middle line of the neckm and downwards over the clavicle to about the level of the second intercostal space. About the level of the middle of the right sterno-mastoid, and just in front of that muscle, there was a sinus which was discharging freely. A diagnosis was made of sequestrum of one of the cervical vertebræ, and scar tissue involving the cutaneous branches at least of the cervical plexus. These, it will be remembered, emerge from behind the sterno-mastoid muscle and radiate in various directions. Passing upwards along the sterno-mastoid muscle —posterior border—is the lesser occipital nerve from the second cervical, Running obliquely forwards and upwards towards the mastoid process is the great auricular nerve from second and third cervical. Passing transversely forwards is the nervus cutaneous colli—the transverse cervical of the old terminology. In a downward direction there course the three groups of supra-clavicular descending branches from third and fourth cervicals.

At the operation on November 7th, 1918, the sinus of the neck was opened up and the sequestrum removed. A separate incision was then made along the posterior border of the sterno-mastoid muscle, and all the cutaneous nerves were identified, as were also the spinal accessory nerve and a communicating branch to it from the third and fourth cervical nerves. Portions of the small occipital, of the great auricular, of the transverse cervical and of the descending supra-clavicular nerves were removed. The result, from the first, was gratifying. The tenderness disappeared entirely and the subjective pain was much diminished. The wound behind the sterno-mastoid healed at once, and the discharge from the anterior wound diminished, although it did not cease for a considerable time, the reason being that a pocket had formed between the bodies of the lower cervical vertebræ and the prevertebral fascia. This was identified by bismuth injections. With some difficulty a demand for further operation was resisted and the sinuses ultimately closed. The result has been as gratifying to the patient as to the surgeon. This case is interesting inasmuch as it brings into prominence the great importance of cutaneous nerves, structures rather despised and rejected of the student of anatomy because they are at times hard to find. In resecting cutaneous nerves it is not enough merely to cut them across. A full inch ought to be removed. If they are merely sectioned they will certainly re-unite, a circumstance fortunate enough for most of us.

Mr. L. T., a locomotive engineer, was compelled suddenly to reverse his engine. The movement required that he exert every ounce of his strength. He felt something give on the left side of his neck. This was followed by some pain at the spot which, however, soon disappeared and was not felt for several months. He now feels discomfort at times in the thumb, forefinger and middle finger of the left hand. When certain movements of the left arm are performed, these movements not being very definite in direction and not requiring any special degree of force, a tingling sensation passes through the three digits mentioned. These correspond to the sensory supply of the median nerve to the fingers and the fibres composing them come from the eighth cervical root. An *x*-ray was taken of the lower cervical spine and shows a fracture of the left transverse process of the seventh cervical vertebræ. Here at once is the explanation of the condition. The transverse process has been torn from its attachment by some of the muscles attached to it, probably the scalenus medius and posticus. The displacement is just sufficiently great for it to impinge during certain movements upon the eighth cervical nerve as it comes out below the seventh cervical vertebræ, but not sufficiently pronounced to cause atrophy of the muscles supplied by these fibres or even continuous pain from pressure.

Another somewhat interesting case, illustrating the close correlation between sensory and motor nerves is that of Lieut.-Col. H. A large shell burst close to his right side and various fragments of it caused wounds of different degrees of severity. Among others he had a small scar on the right cheek which was at first passed by as of no importance. He complained, however, of lacrimation of the right eye, when it was exposed to cold, to wind or to bright sunshine. There was also hyperæsthesia of the skin of the right cheek and right upper lip, and of buccal mucosa on the right side. There was no paralysis or atrophy of muscles of the right side of the face, but there was a constant spasmodic twitching along a line from the malar bone to the right angle of the mouth, a line which corresponds to the zygomaticus muscle. Apparently there was scar involvement of branches of the infra-orbital nerve coming from the maxillary division of the trigeminal and also of the buccinator branch of the mandibular portion of the fifth nerve. This resulted in hyper-excitability of the branches of the same nerve which supply the conjunctiva, and consequent on this, increased activity of the lacrimal gland. At the same time at least one of the facial muscles, the zygomaticus, became more excitable, resulting in a spasmodic twitching analogous to that found in spasmodic torticollis. Through a small incision the zygomaticus muscle was identified and its fibres divided transversely. The result was immediate and complete abolition of the spasm. Suitably tinted glasses afforded some diminution in the intensity of the stimuli applied to the conjunctiva. The result was fairly satisfactory.

The advantage of precise anatomical knowledge is not confined to the surgery of peripheral nerves. Some years ago a friend came to me asking for a demonstration of the Anatomy of the Temporal Bone. I enquired what in particular he desired. "Well, you see," he said, "it's this way. Out on the northwest frontier of India where I am, I've to do all sorts of things, and lots of the natives come along with mastoids. I operate on them, and the beggars are awfully grateful and all that sort of thing, but they all get facial paralysis." The complication alluded to is not restricted to the North West frontier of India, indeed several cases have occurred in Canada. With the most careful technique an accident may happen. Sometimes the condition occurs quite apart from operation. Sometimes, as in a case following extirpation of the cochlea, it may be necessary to sacrifice the facial nerve deliberately and of set purpose. Whatever be the cause, the disability is a serious one and anything which will improve the resulting deformity is worth serious consideration. The opportunity of attempting to improve this deformity has been presented to me in some seven cases, and five of these are of sufficiently long standing for one to hazard some opinion as to the value of operation. Let me quote one case by way of illustration.

Mr. J. S., aged thirty-eight, consulted me on December 5th, 1918, complaining of facial paralysis involving the right side of the face. The onset was gradual about seven years before this. During the last four years the condition had been very noticeable. There was no history of operation nor of suppuration in the middle ear. On examination there was found complete facial paralysis on the right side with extreme atrophy of the facial muscles, drooping of the lower-eyelid and of the angle of the mouth. There was no paralysis of the soft palate, and no atrophy of the tongue. Knee jerks were present on both sides and were not exaggerated. The Wassermann reaction was negative. Electrical reactions of the facial muscles were tested. These showed no response to Faradic stimulation, but some response to the Galvanic current.

A special report on the condition of the ears was as follows:

"Examination shows 'otitis media catarrhalis chronica' in both ears, worse in the right ear with involvement of the seventh and eighth nerve in right ear. Lesion of both nerves, probably in the internal meatus."

Having regard to the hopeless prognosis in this case, one advised that an attempt be made to transfer the central end of the hypoglossal to the distal part of the facial nerve. This was done on January 13th, 1919. It is possible to obtain union of these nerves without any tension, if the facial nerve be followed up to the stylomastoid foramen, and if the hypoglossal be cut off at the anterior border of the hypoglossus muscle, just before it breaks up into a leash of branches. The branch to the thyro-hyoid, and the descendens hypoglossi are seen and usually have to be sacrificed. No disability is noticed in these cases, as a direct result of section of those two branches. Paralysis of one half of the tongue is immediate and is permanent. This, however, causes almost no inconvenience. For a week or two the speech is rather thick, and when the tongue is protruded it does not go forward in the middle line; but atrophy commences at once, and after a few months have elapsed no difference from normal, as regards function, is observable. Some use the accessory nerve in preference to the hypoglossal, but the latter seems to me to be preferable. Massage of, and light Galvanism to, the facial muscles was instituted at once and improvement began to show itself in a short time. The patient now has voluntary power in most of the facial muscles and with the face in repose the paralysis is not at all noticeable. When he smiles, of course, the normal muscles make the discrepancy between the two sides very evident. Improvement is still taking place, although I cannot predict to what extent recovery will actually occur. Even if no further gain is made, the change is sufficient to justify the operation.

In five out of the seven cases, voluntary power is present to some extent. One is therefore justified in concluding that the operation has a distinct place in surgical therapeusis.

The plea submitted in this paper is the importance of precise anatomical information in regard to peripheral nerve lesions, but it is in reality a wider plea than that. It applies to all our surgical problems. True, one can perform a great deal of useful work with a modicum of anatomical knowledge, but it is in dealing with cases that are somewhat out of the beaten track, where one does not recognise the condition as something one has seen before, that anatomy is of so much importance. It lends a confidence to one's actual work, and prevents many a shock when the patient has recovered from the anæsthetic. One has seen, for instance, paralyzed spinati muscles not infrequently after removal of glands from the posterior triangle of the neck, and a wrist drop which did not exist before operation has been present after an operation on the humerus. "There is nothing new under the sun," and the motive of this paper is simply the ancient adage, "Man, know thyself."

THE SURGICAL TREATMENT OF CHRONIC INFECTED OPEN PNEUMOTHORAX

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SINCE October, 1918, the majority of cases of chronic discharging chest cavities among soldiers and pensioners in Eastern Canada have been admitted to the surgical service at the Ste. Anne de Bellevue Military Hospital. Through the kindness of Drs. J. M. Elder and E. M. Eberts, two cases in the Montreal General Hospital have been placed under my care. From these two sources, the author has had the opportunity of studying twenty-five cases of chronic chest sinus.

Eleven cases followed gunshot wounds of the chest; thirteen were the result of post-pneumonic empyema; one was due to tuberculosis of the sternum.

The average duration of the discharging sinus prior to admission to our service, was over fifteen months. The shortest had been suppurating for four months; the longest for four and one-half years.

In eleven cases (Table I) the cause of the persistent sinus was found to be of a trivial nature, such as the presence of sequestrum, or other foreign body. In the remaining fourteen cases (Table II), the intrathoracic cavity was of sufficient size to demand treatment of the cavity as such. The average duration of the latter group of cases, prior to admission was seventeen months.

Of these cases, one large basal cavity (500 c.c.) No. 12, healed promptly, following the institution of adequate drainage and the removal of a fragment of dead bone. One case, No. 13, healed after the employment of bismuth paste (Beck). Hypochlorite irrigations resulted in obliteration of large cavities in two cases. In the remaining ten cases, decortication or pneumolysis of the fixed lung was carried out. The average duration of the disease prior to attempting radical operation was twenty-three months. Twenty-six months after the commencement of this study, the results are as follows: Twenty-two cases are cured; one was discharged from hospital, with persisting sinus; one patient died; and one is still under treatment. The determining cause of persistence of the sinus was judged to be:

Dead bone or osteitis, 6 cases; projectile (liver, lung hilus), 2 cases; rubber drain, 2 cases; suture (silk worm gut), 1 case; insufficient drainage, 2 cases; fixation of cavity, 11 cases; bronchial fistula, 1 case. (Bronchial fistulae were present in five cases, but in four did not appear to be the chief cause of the persisting cavity.)

Upon admission to hospital, all patients have been subjected to rigorous examination, both as regards their general constitutional state, and more particularly regarding the function of, and pathological condition in the chest. This examination has included stereoscopic x-rays, and occasional fluoroscopic examinations, to note fixation of lung and function of diaphragm.

The thorax has been examined for mobility and by means of percussion and auscultation in order to demarcate the cavity in so far as possible, and in order to have information available, which might be of value in following the progress of the case.

During the first two or three weeks following admission of the case, we have been content to remove all drains, if such were present upon admission, and to attempt to guage the general physique and resistance of the patient, in order that we might be able better to decide what type of operation, if any, was indicated. During this period of observation, everything possible has been done to increase the strength of the patient, to improve his weight, and to diminish his anæmia. Efforts have been made to have him employ blow bottles, or foot-ball bladders in order to improve the function of the chest. Graduated exercises in the gymnasium have been ordered, and for those cases, whose general health justified more severe exertion, canoeing and cross-country walking have been recommended.

Two cases (Nos. 4 and 9) have been followed by prompt permanent healing of the sinus, as soon as the drain was removed from the side. In other cases, in which the cavities appeared to be small, discontinuous irrigations with hypochlorite solutions (Dakin's or Eusol) have been employed in the hope of assisting in the sterilization of the cavity.

In several cases, great discomfort was caused our patients, as the result of the chlorine solution entering bronchial fistulæ. In consequence, we have made a habit of commencing irrigation of cavities very cautiously, and employ saline solution before proceeding to the use of the more irritant chlorine solution. Oxygen irrigations as recommended by Tuffier[1] have not been tried.

In cases of pyocyaneus infection, we have taken advantage of the recommendation of Taylor[2] regarding the use of acetic acid. The prompt control of this troublesome infection by the use of a solution containing one to one and a half per cent. acetic acid has, in these chest cases, as in other cases in which it has been used, proved very satisfactory.

In cases of smaller cavities, which have not promptly responded to removal of foreign substance, such as drains, sequestra, etc., followed by hypochlorite irrigations, we have employed injections with Beck's paste. In general, it may be stated that our experience in the use of this paste has been extremely satisfactory. Several cases have promptly healed and remained healed for many months, we believe permanently. In no case has the injection been followed by untoward results. The employment of Beck's paste, after the manner recommended by its originator, is heartily endorsed by the author.

Previous experience[3,4] in the use of Rutherford Morrison's technique, and the employment of his bismuth iodoform paraffin paste (B.I.P.P.) has induced us to make use of his technique at operations upon infected chests.

It has been our custom after completion of whatever operative interference was deemed necessary or advisable in the individual cases, to dry the surface of the wound by the employment of alcohol, and to rub the surface thoroughly with a thick B.I.P. paste. All excess is carefully rubbed off, and the remaining cavity tightly in the smaller cavities, less tightly in the larger cavities, packed with gauze wrung out of liquid paraffine, to which a small amount of B.I.P.P. has been added.

In the employment of B.I.P.P., the possibility of poisoning must, of course, be borne in mind. The author has elsewhere stated that if less than one square foot of tissue be exposed to the paste, the danger of any important poisoning is, in his opinion, absent. Not infrequently the total area of chest cavities is very considerably greater than one square foot. In such cases, the application of the paste should be made to those areas only in which foci of infection are to be most dreaded. Too great stress cannot be laid upon the proper technique in the use of the paste.

Although our results from the employment of the hypochlorite solutions, have not been so spectacular as those reported by Depage[5], Graham[6], and others, we have had two cases (Nos. 15 and 23), of large, almost complete cavities, of five and eighteen months' duration respectively, which have permanently healed, following frequent irrigations with Dakin's solution. This technique should always be attempted, either in lieu of, or in preparation for, more radical procedures.

In consequence of the marked thickening of the parietal pleura, which is present in all long-standing cases of open pneumothorax, both radioscopic and physical examination are usually of relatively little value in determining the shape and extent of the cavity. A generous rib resection, and visual and manual exploration of the cavity are usually necessary for this purpose, as well as for the proper administration of hypochlorite irrigations.

One case (No. 10) was discharged from hospital with a persisting sinus. This case was the result of a gunshot wound of the chest. The projectile was situated behind and close to the base of the heart. The sinus, which discharged through an opening in the lower part of the sternum, ran irregularly upwards and inwards. At operation a large trephine opening was made in the sternum about the sinus and the heart exposed. This organ, however, prevented a further view of the sinus, and the projectile, which was small, measuring apparently 1 x 5 c.m. in size, could not be palpated. The patient was kept under observation following this operation for eight weeks, and discontinuous irrigations with eusol were employed. In as much as the patient's general condition was good, and the discharge scanty, he was discharged from

TABLE I

Persistent Sinus Due to Causes Other Than Extensive Cavity

No.	Case	Original Cause	Duration in Months	Description	Procedures Employed	Result
1	A.R.F.	G.S.W.	18	Exfoliated rib. Small cavity	Sequestrectomy, B.I.P.P.	Cured
2	U.O.G.	G.S.W.	12	Osteomyelitis of rib, extensive	Excision, B.I.P.P., suture	Cured
3	M.R.A.	......	6	Tuberculosis of sternum	Excision, B.I.P.P., suture	Cured
4	E.T.S.	Empyema	24	Drainage tube, small cavity	Removal tube	Cured
5	I.E.W.	G.S.W.	9	Sequestrum, small cavity	Sequestrectomy, B.I.P.P.	Cured
6	H.W.	Empyema	10	Abscess chest wall, small cavity	Improved drainage, B.I.P.P.	Cured
7	L.A.W.	G.S.W.	9	Exfoliating osteitis of scapula	Partial resection, B.I.P.P.	Cured
8	I.H.T.	G.S.W.	14	Scar tissue chest wall, small cavity	Excision	Cured
9	A.C.	Empyema	8	Drainage tube, small cavity	Removal tube	Cured
10	H.W.	G.S.W.	18	Projectile in lung hilus	Improved drainage, discontinuos irrigation	Discharged from hospital
11	L.E.G.	G.S.W.	17	Closed pneumothorax, buried silkworm gut suture	Removal suture in excised scar	Cured

TABLE II

Persistent Sinus Accompanied by Large Cavity

No.	Case	Original Cause	Duration in Months	Size of Cavity (estimated)	Description	Procedures Employed	Result
12	R.E.B.	G.S.W.	15	500 c.c.	Rib sequestrum, cavity at base	Sequestrectomy, improved drainage, B.I.P.P.	Cured
13	O.C.	G.S.W.	12	200 c.c.	Bronchial fistula	Beck's paste	Cured
14	R.C.	Empyema	8	600 c.c.	Dense walled cavity at base	Decortication, complete visceral. Later sequestrectomy	Cured
15	O.McR.	Empyema	18	500 c.c.	Apparently dense walled cavity in upper part of chest	Improved drainage, Dakin's solution, Beck's paste	Cured
16	D.McD.	G.S.W.	18	300 c.c.	Large projectile in liver. Dense walled cavity. Bronchial fistula. Pyocyaneus infection.	Removal F.B. Improved drainage. Partial decortication. Acetic acid irrigations. Beck's paste	Cured
17	M.McD.	Empyema	30	Almost Complete	Fixed cavity including apex. Bronchial fistula. Interstitial fibrosis of lung	Improved drainage. Decortication, complete visceral (no expansion). Plastic operation (Beck). Collapsing thoracoplasty extensive	Still under observation
18	S.McM.	G.S.W.	12	150 c.c.	Sinus anterior; cavity posterior	Dissection of sinus. Partial decortication	Cured
19	A.R.G.	Empyema	34	300 c.c. 800 c.c.	Two large mixed cavities, one situated anteriorly over base, and one posteriorly involving upper part of chest	Decortication of both cavities at separate operations. Partial collapse of chest wall	Cured
20	H.C.S.	Empyema	8	100 c.c.	Small very dense walled cavity; abscess of soft parts	Decortication. Incision, B.I.P.P.	Cured
21	A.E.R.	G.S.W.	9	Almost Complete	Fixed cavity involving apex of chest. Old Carrel tube in apex of cavity. Bronchial fistula	Removal F.B. Decortication complete, visceral	Cured
22	J.E.D.	Empyema	15	150 c.c.	Apex involved. Bronchial fistula. Extreme emaciation. Nephritis. Institial fibrosis of lung	Improved drainage. Partial decortication (no expansion). Adequate operative interference not attempted	Died (Nephritis)
23	G.D.	Empyema	5	Complete	Dense walled cavity, half-filled with pus	Wide thoracotomy. Dakin's solution, frequent irrigation	Cured
24	R.O.H.	Empyema	4	1000 c.c.	Apparently fixed cavity, base and upper part of chest	Decortication, complete visceral	Cured
25	B.C.	Empyema	54	Complete	Fixed cavity, marked deformity	Decortication, complete visceral	Cured

hospital in order that he might engage in civil occupation.

In one case (No. 13), the usefulness of Beck's paste injection was exhibited in a spectacular manner. The patient, who has suffered from an empyema following gunshot wound of the chest twelve months previously, was admitted to hospital with a sinus discharging moderate quantities of thick creamy pus. Bronchial fistulæ was evident; the size of the cavity which was irregular in shape was shown by radiograph to be 7 by 5 centimeters in diameter. Despite the pulmonary fistulæ, the cavity was, for the purpose of radioscopic examination, injected with bismuth paste. The patient coughed up a considerable portion of the injected paste, during the injection and for the ensuing four or five days. The sinus, nevertheless, closed almost immediately and remained closed for a period of two months when, owing to his excellent general condition, he was discharged from hospital. Radiographs made at the time of his discharge showed that he still retained in his chest a small portion of the injected paste.

In the author's opinion, the operation of decortication should be undertaken if, after the induction of adequate drainage, the removal of foreign bodies and the conscientious employment of hypochlorite irrigation, the obliteration of the cavity and arrest of suppuration are not accomplished within three or four months.

The operation of decortication is not difficult, provided adequate exposure of the chest cavity, and a dry field is obtained. This latter desideratum is largely a question of a suitable packing and refraining from undue haste. The results reported by Tuffier[7], Lilienthal[8], Hedblom[9] and others, as well as those of the author, prove that the mortality is very small. The operation is not a mutilating one, in fact, not only is function much increased, but deformity is to a very considerable degree overcome.

The results of the operation with regard to the elimination of open pneumothorax, and the arrest of infection and consequent suppuration, have been most gratifying.

In long standing cases of large suppurating cavities, the extreme degree of dense thickening of the parietal pleura (in one case 2·0 centimeters) together with the approximation or overlapping of the ribs, renders the ordinary intercostal thoractomy incision with the use of a rib spreader inadequate to permit satisfactory exposure for decortication. Although Tuffier reports that in his hands this incision has proved sufficient, the author has found a more radical method of approach necessary in all long standing cases.

Depending upon the thickness of the parietal pleura and the amount of overlapping of the

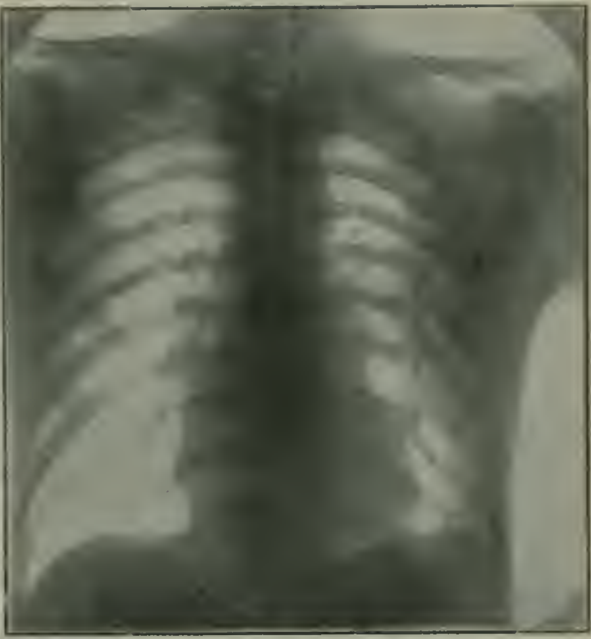

Fig. 1. Radiograph Case 24, one month after operation,—decortication. Sound permanent healing had occurred by this time.

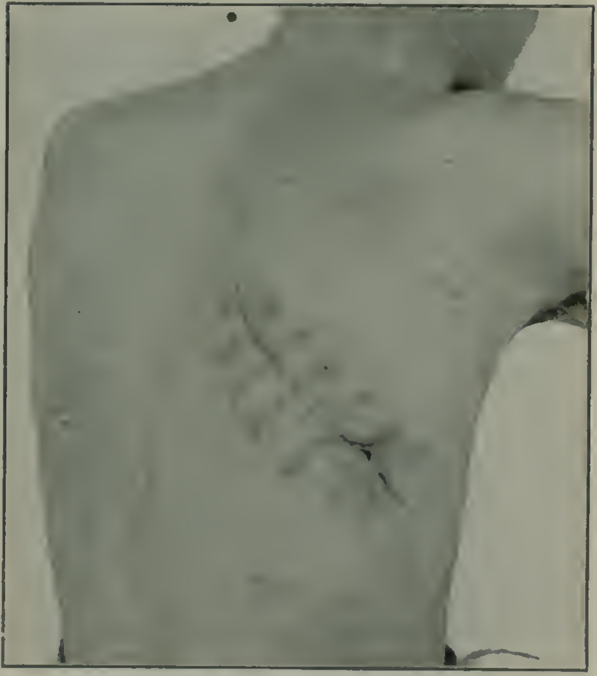

Fig. 2. Photograph Case 14, two weeks after operation. A secondary operation for removal of small exfoliated rib fragment was afterwards necessary.

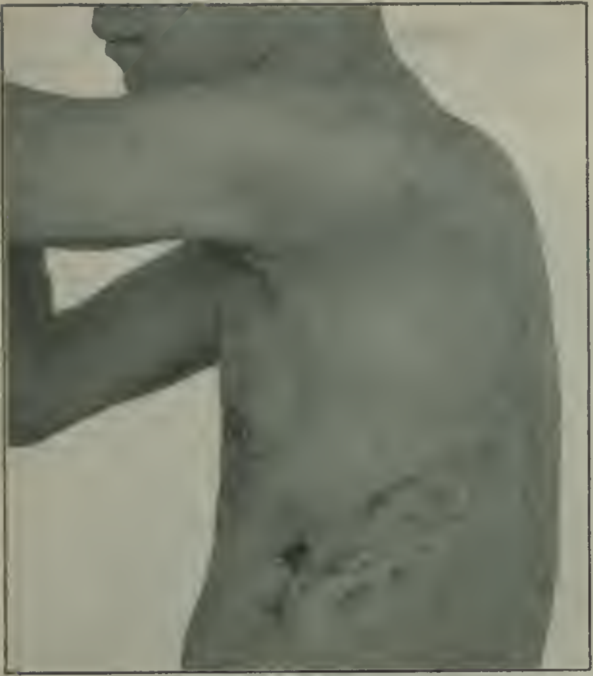

Fig. 3. Photograph Case 19, one month after operation on posterior cavity. A small bone fragment was afterwards removed.

ribs,—resection of the whole length overlying the lower portion of the cavity of one, two, or three ribs together with the intercostal tissues and the underlying pleura has been found necessary. In addition, the suggestion of Lilienthal of sectioning three or more ribs at their posterior ends, upward from the point of entrance into the chest has been made use of. The ribs from the tenth to the fourth, have been thus cut in several cases. In no instance have I found it necessary to section the second or first ribs. The recommendation by the same author (Lilienthal) that Liston's bone cutters be used instead of the ordinary costotome, simplifies the division of the ribs, and I believe, minimizes hæmorrhage.

When the ribs are removed, or cut, and the intervening soft tissues are divided, there occurs immediately profuse bleeding from the cut intercostal vessels. Owing to the cicatrical denseness of the chest wall the effective application of hæmostats and ligatures is extremely difficult. Fortunately, neither procedure is usually necessary. If the cut surfaces are firmly packed, and the packs left undisturbed for three or four minutes, the bleeding stops, and a dry field is obtained for the intrathoracic part of the operation.

Continued open pneumothorax accompanied as it always is, by infection and consequent inflammatory reaction, results in marked thickening of the parietal pleura, and the formation over the compressed lung, the pericardium (if the left chest be involved), and the diaphragm, of an organized membrane of variable thickness. This covering is always dense, and since it is intimately attached to the parietes throughout its entire periphery, prevents expansion of the lung, and opposes to the almost non-collapsible outer chest wall, an inner surface equally inelastic. Not only, indeed, does this inner lining confine the lung to its early collapsed position, but by virtue of the inherent tendency of newly formed collagenic tissue to contract with the passage of time, the lung is further displaced toward the mediastinum.

The thickened layer of tissue over the visceral is never as thick as that over the parietal pleura. Even in very long standing cases, two to four years, it does not measure more than two to four millimeters in thickness if the surface has been rendered free from fibrin by the adequate employment of hypochlorite solution.

It must be noted that the confining membrane does not represent a thickening of the visceral pleura itself, but merely an overlying dense fibrous tissue covering. A line of cleavage between the two membranes is present, and if this line be found at operation, decortication of the entire superficial surface of the lung is usually easily accomplished. Not infrequently the visceral pleura has been destroyed over several small areas measuring from one to one and a half centimeters. In consequence, it is impossible to strip off the covering of the lung. If such be the case, either an artificial line of cleavage may be made with the scalpel and a small area of fibrous tissue covered pleura allowed to remain, or as has most frequently occurred in the author's experience, these adherent spots are not recognized until the pleura, and the more superficial layers of the lung have been torn off. The black looking tissue so exposed, soon commences to bubble air, and may at first bleed profusely. In my experience, this hæmorrhage is promptly arrested by pressure and does not recur. At no time has the author found it necessary to apply a ligature. In one case (No. 17), these adhesive areas were very extensive, with the result that over an area of approximately the size of the palm of the hand, the pleura was removed without untoward result.

The apical portion of the lung is difficult to expose properly without resection of the first and second ribs. This is time consuming and may be mutilating, and has not been undertaken by the author. Without complete visual exposure, the excision of the membrane is not without danger. The author has been content to simply split the membrane longitudinally cutting from the lung outward, and to separate the membrane as far as the chest wall, leaving those parts of the membrane that could not be drawn into the field of vision lying loose.

The covering over the pericardium is readily separated: that over the diaphragm is usually more adherent. Care should be taken not to injure the latter structure. In so far as the membrane can be removed without injury, this should be done, otherwise it should simply be incised. Such incisions are better made parallel to the muscle fibres.

If the preliminary irrigation of the chest has failed to reach any loculated foci, and infection of the wound is feared, the latter is "bipped" prior to closure, and a "bipped" paraffin gauze drain is placed in the cavity and drawn through the dependent portion of the thoractomy wound. If infection appears to have been adequately controlled B.I.P.P. is not used, and simply a small paraffin gauze drain is inserted.

The wound is closed in layers,—but few cat-gut sutures are necessary, or desirable, although the divided latissimus dorsi and the scapular muscles should be carefully coapted.

After operation, the patient is propped up in bed: morphine is freely administered during the first forty-eight hours, after which time the patient suffers but little. The gauze drains are removed at the end of forty-eight hours, and the patient is induced to cough, and to increase the intrapulmonary pressure by blow bottles or a foot-ball bladder. As soon as possible, he should be out of bed and breathing and general exercises begun.

In but one case in our series was it not possible to obtain sufficient inflation of the lungs to obliterate the cavity. This patient suffered from a large bronchial fistulae, which rendered hypochlorite irrigations impossible. This, perhaps, interfered in part with the usefulness of the operative procedure. In this case a plastic operation, as described by Beck[10], was attempted four years after the onset of the disease. Two large flaps were turned into the cavity, and for three weeks the appearance of the wound suggested that a successful outcome might be hoped for. Unfortunately, however, he developed a severe influenzal infection, and although he survived, the extra demands upon his tissues sufficed to arrest all reparative power, and the wounds opened up.

As all available tissue had been employed at the

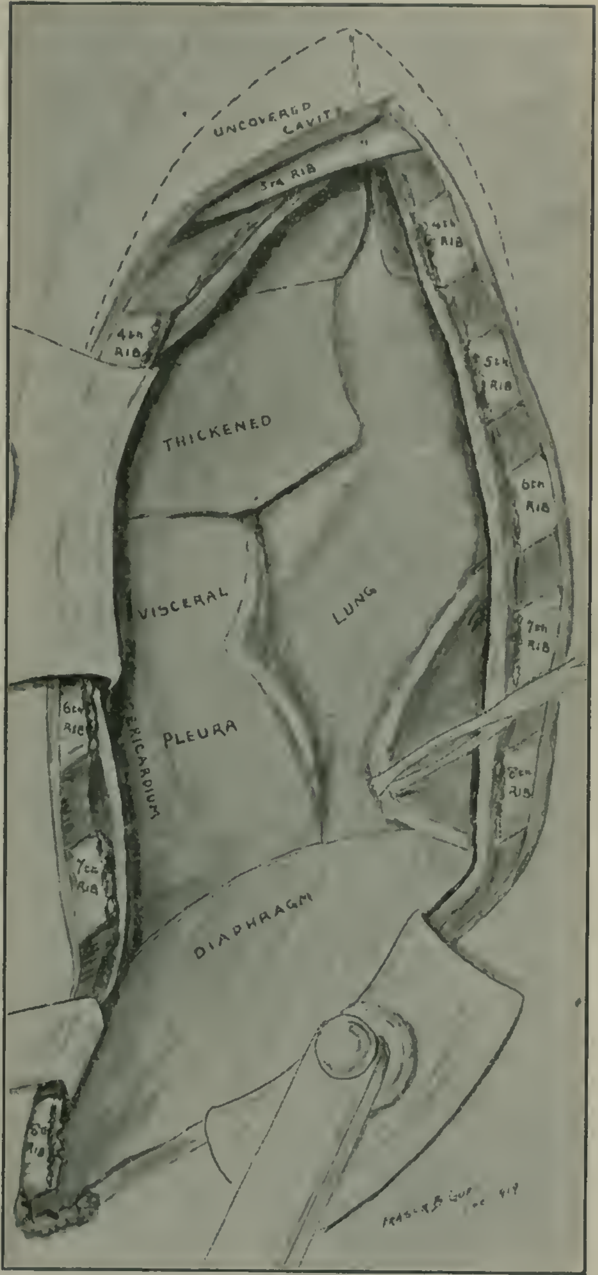

Fig. 4. (Fig. 8 in previous manuscript). Semi-diagramatic drawing of operation in Case 21. Illustration shows the adequate exposure of cavity and decortication of the lung partially completed. Although the chronic open pneumothorax has persisted for over one year prior to pneumolysis, the enveloping membrane was removed comparatively easily. (Drawing is approximately ⅔ natural size).

preceding operation, it was necessary to attempt a more completely collapsing procedure. This was undertaken, and all the ribs from and including the second to the tenth, were removed from close to the spine, as far outward as the mid, or anterior, axillary line. The last operation was performed four months ago, and although it is hoped that cure will be accomplished, healing is as yet by no means complete.

In performing the operation of decortication, the author has employed both local, and the various forms of general anæsthesia. The most satisfactory results have been obtained by paravertebral nerve blocking with procaine, assisted by the use of chloroform. Light chloroform anæsthesia only has been employed. It has been our aim to retain the coughing reflex in order that in the event of injury to the lung, any hæmorrhagic material might be immediately expectorated, and that the uncovered lung might be inflated while under observation. For the latter purpose, we have found methods of pressure anæsthesia inadequate.

SUMMARY

Extrapulmonary cavities in the thorax continue to exist and become chronic with resulting persistent sinsues for one or more of the following reasons:

1. The drainage opening is not dependent. In consequence, there is always present in the chest cavity a residual amount of purulent material which acts as a foreign body and is a nidus for bacterial growth.

2. The drainage opening is too small; in consequence there is always a certain amount of purulent material dammed back.

3. Foreign bodies are present; commonly a rubber tube drain employed in the original drainage of the cavity is left in position too long. It is advisable to remove all drainage material as soon as the amount of discharge commences to decrease, or to become serous in character. If there be a re-accumulation of pus, it is a simple matter to re-open the sinus. The other type of foreign body frequently present consists of sequestra, the result of exfoliation of rib ends following resection. Occasionally an infective osteitis is present.

4. A communication between the bronchial tree and the pleural cavity, pleuro-bronchial fistulæ, is a not infrequent cause of renewed infection of the pleural cavity, and consequent persistence of the condition of open pneumothorax.

5. Dense fibrous membrane formation over the pleura, accompanies persistent pneumothorax and continued suppuration. This membrane binds down the lung so that expansion of the latter is impossible.

6. Occasionally interstitial fibrosis of the lung tissue takes place, which further interferes with lung expansion.

The following is an outline of procedures which may profitably be employed in the treatment of discharging chest sinuses.

1. Unless there be obvious reason for doing otherwise, remove all drains, if such be present, and give the tissues an opportunity of healing. In our series this resulted in cure in two cases.

2. Explore the chest cavity, remove sequestra, improve drainage, and employ germicidal adjuvants, *e.g.*, hypochlorite solution according to Carrell's technique (Depage, Tuffier), B.I.P.P., flavine, and Beck's paste.

3. If a dense non-expansile membrane covers the lung, liberate the lung by removal of the confining membrane—decortication—pneumolysis.

4. If decortication does not result in sufficient expansion of the lung to fill the cavity it is necessary to collapse the chest wall by the removal of one or more, and the section of several ribs.

5. If for anatomic reasons it is impossible to collapse the chest wall and so obliterate the cavity large flaps may be turned from the abdomen or back and the cavity lined,—Beck's operation.

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INJURIES OF THE SPINE

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FRACTURES, in general, derive their chief importance from the fact that the broken bone is no longer able to support its accustomed weight. In fractures of the spine, however, the injury to the bone is quite secondary and the damage sustained by the contents of the vertebral canal is of paramount importance. Consequently, any discussion of spinal injuries must essentially be one dealing with the cord.

The vertebral column, as far as injuries in civil life are concerned, may be said to consist of the cervical, dorsal and lumbar vertebræ. Each vertebra consists of a body, pedicles and laminæ enclosing the vertebral canal and transverse articular and spinous processes. An intervertebral disk and numerous ligaments join the vertebræ together and it is upon these, rather than muscular attachments, that the spine depends for its strength. The articular processes deserve particular mention. In a general way the superior facets in the cervical region are directed upward, in the dorsal, backward, while in the lumbar region they look inward. From a surgical standpoint the column may be divided into a comparatively fixed portion which includes the upper ten dorsal vertebræ and a movable portion made up of the cervical, eleventh and twelve dorsal and lumbar areas. It will be noted that the more fixed segment is that to which the true ribs are attached, and these necessarily limit the movements of the thoracic area. There is a close connection too between the amount of movement and the size of the spinal canal which is wide and triangular in the neck and lumbar regions and narrow and rounded in the thoracic.

Within the spinal canal is the cord protected by a tough strong membrane the dura mater. This membrane in the greater part of its extent lies free in the canal being attached around the foramen magnum, second and third vertebræ above the and third sacral below. The cord itself ends at the lower border of the body of the first lumbar below which level is to be found the leash of nerves known as the canda equina. Since the cord is shorter than the vertebral canal it becomes necessary to know the relationship between the various cord segments and the surface. The spinous processes are readily palpated and are therefore taken as the guide. Roughly, if we add one to the number of the spine in the cervical region, two to the number of the spine in the upper dorsal and three to the number of the spine in the lower dorsal region it will give the number of the cord segment subjacent. For example, the tenth cord segment—that portion of the cord from which the tenth pair of nerves come off—is opposite the seventh dorsal spine. In other words, the farther we go down the longer do the intraspinal portions of the nerves become, until in its lowest part they run a course of seven to eight inches before leaving the canal.

For all practical purposes injuries of the spine may be divided into:

1. Those which damage the supporting structures and
2. Those in which there is an associated nerve lesion.

In Class 1 the injury varies from the simplest sprain in the nature of a torn ligament or loosening of a muscular attachment to a dislocation or even a fracture dislocation. A spinous or transverse process may be knocked off or a lamina may be pressed in. In the minor injuries rest in bed until the parts have a chance to heal will usually suffice; the more serious lesions will be considered in dealing with cases in Class 2.

There are two ways in which the spine is injured, direct and indirect force. Leaving out of consideration for the time being cases of gunshot wounds, the great majority are due to indirect violence. The most common result of direct injury is a fracture of a spinous process. A transverse process is occasionally broken in this manner and rarely a lamina is cracked or even driven into the canal. With indirect force the mechanism is nearly always the same, viz: a flexion of the spine from various causes. A man falls from a height and the upper part of the vertebral column is bent forcibly forward, or a mass of earth falls upon the upper part of the back and the same flexion results. The first result of the acute flexion is a compression of the body of a vertebra which tends to crumple up. The ligaments about the articular processes and the interspinous ligaments, however, hold leaving a moderate kyphosis. If the crumpling process has been complete the body is changed into a pyramidal mass with the base directed towards the dura, and oftentime the bony debris project into the intervertebral canal. If the flexion force is more severe the body of the vertebra separates into upper and lower fragments and there is a slipping forward of the former which, in very bad cases, may come to lie anterior to the lower piece. At the same time there is more or less fracturing of the articular processes and ligaments, especially the interspinous, and a typical fracture dislocation is the result. In other instances there is very little crumpling of the vertebral body but instead a linear fracture which runs from behind downward and forward. As a general rule the dura is not torn and the cord, when pressed upon, is jammed between the postero-superior border of the lower body fragment and the laminæ above. Whether the cord is squeezed or not depends upon two factors, first the amount of displacement, and second upon the size of the vertebral canal, so that a fracture dislocation without cord involvement in the dorsal region is comparatively infrequent.

Dislocation of the vertebra can probably only occur in the cervical region for anatomical reasons, although there are supposedly authentic cases reported in the lumbar area. It is more frequently unilateral and is caused in the same way as the fracture-dislocation by forcible flexion. There is a tearing of the intervertebral disk and a rupture of the capsule of the articular processes. The inferior articular process of the displaced vertebra then come to lie in front of the superior articular process of the vertebra below. If the dislocation is bilateral the same thing occurs on the opposite side.

For anatomical reasons the spine is usually fractured in the lower cervical or the dorsi-lumbar regions. Each area is involved with equal frequency. In Burrell's report of two hundred and forty-four cases, forty-nine per cent. were of the dorsi-lumbar type. At the Toronto General Hospital since 1907 there have been admitted sixty-one patients with some spinal injury, the result of trauma other than gunshot wound. Of these fifty-six were males and five females. Of the females four died in the hospital while twenty of the males succumbed making the average hospital mortality about forty per cent. As to the regional frequency there were fourteen cervical, eight dorsal and thirty-seven dorsi lumbar, which includes the eleventh and twelfth thoracic and lumbar vertebræ. In two instances the records did not state where the fracture was. In percentages the dorsi-lumbar account for sixty-two, the cervical twenty-five, and the dorsal for thirteen, so that the cervical and dorsi lumbar areas, those in which movement is free, account for about ninety per cent. of all the cases. Comparing the mortality in the different regions we find that of the fourteen cervical cases, eight died; of the eight dorsal, seven died and of the thirty-five dorsi-lumbar ten died, giving percentage mortalities of fifty-six, eighty-seven and twenty-seven respectively. Analyzing these cases further we notice that of the fourteen cervical cases, three had no cord symptoms. in the dorsi-lumbar, eight had no involvement, while in the dorsal seven had paraplegia. If only those with cord damage are considered the mortality in the cervical region is seventy-three per cent. that in the dorsi-lumbar is thirty-six, while that in the dorsal is eighty-seven. These are set forth in the following table:

Region	Total No. Cases	Without Cord Involvement	With Cord Invol.	Mortality All Cases	Mortal- With Cord Invol.
Cervical. .	14	3	11	56%	73%
Dorsal 1-10	8	0	8	87%	87%
Dorsi-Lumber 11-12D. Lumbar..	37	8	29	27%	35%

It is impossible to accurately compare this table with that of Burrell who makes four subdivisions as to the region involved. In the cervical, however, it can be done. Thirty-three per cent. of his total were in this region and the mortality was eighty-five per cent. His mortality in all regions was seventy-one. Gurlt's mortality from two hundred and seventy collected cases is eighty, a figure exactly twice as large as in the series here reported. It is to be borne in mind, however, that forty per cent. means hospital mortality, a goodly number of those who were discharged doubtless having died subsequently.

The pathological changes in the cord vary from a complete severance with an inch or more separating the ends to one which to the naked eye presents no abnormality whatever and it is not until a section is made that the destruction becomes evident. Frequently there is a slight transverse depression or dent posteriorly and evidence of congestion or softening. Later on, at operation or autopsy, the cord may show a distinct narrowing as if it had been tied with a string and adhesions may be present binding the cord to the dura. In every case of cord injury hæmorrhage plays a very important part. It may be beneath the dura giving rise to the condition known as hæmatorrhachis, or what is infinitely more important into the cord itself, producing a hæmatomyelia. In the former the effused blood has ample space and gravitates to the dependent part and in fact does very little harm. It is very different, however, with the latter for even minute extravasations damage the cord and at the same time exert more or less pressure upon adjacent areas with consequent loss of function. With larger hæmorrhages the destruction is very great, cavity formation in the cord being often a late result. Sometimes the cord has not been compressed at all by the fracture and yet paralysis occurs, due solely to focal hæmorrhages which usually involves the gray matter and preferably the anterior horn.

Gunshot fractures of the spine were very frequent during the great war—naturally, they showed many gradations. Unlike the injuries in civil practice they were frequently associated with wounds elsewhere so that many were immediately fatal. Besides the various fractures of the body or laminæ and processes with more or less pulping of the cord there were many instances where the missile merely traversed the structures adjacent to the spine and yet there was immediate paralysis, or a shell may simply have burst near the victim and yet the same phenomena develop. Such paralysis usually involves the legs and as a rule the sphincters escape. On section it has been found that there is widespread damage to the cord in the nature of hæmorrhage, œdema, softenings, and often an ascending cavity formation such changes occurring within a few hours of the accident.

The symptoms of a spinal lesion with cord involvement depend in general upon the amount of damage and the location. As a rule, immediately after the accident if the individual be conscious, and he usually is, he notices that all sensation has gone from below the seat of injury and that he is paralyzed. Occasionally one meets with an individual who, after having been knocked down, was able to get up and walk some distance and then suddenly fall completely paralyzed from the waist down. In such an instance the cord must have been contused by the fall and the hæmorrhage did not occur for some minutes. In another type there is immediate paralysis but it is only partial. For example, one leg becomes paralyzed and more or less anæsthetic, while the other escapes, but the bladder and rectum are commonly involved. In most instances, however, there is immediate complete paralysis and anæsthesia, with loss of bladder and rectal control. The paralysis is of the flaccid type and all forms of anæsthesia are present. Frequently, there is a band of hyperæsthesia, two to three inches wide, just above the anæsthetic area and due to irritation of the posterior roots. The reflexes vary tremendously but if the cord is completely divided they are all lost below the lesion, so that if any reflex remains one can safely say that some improvement is at least possible. Apart from this no positive deductions can safely be made from their study, so variable are their manifestations. Pain is of two varieties—local, when it is due to the injury in the neighbourhood and radiating caused by irritation of the nerves. The paralyzed bladder and rectum, especially the former, are always prominent symptoms and of very great importance. The bladder and rectum are controlled by a centre in the third and fourth sacral segments of the cord. From this autonomic fibres, the nervi erigents, proceed to the pelvic plexus of the sympathetic and from there are distributed to the detrusor muscle of the bladder and lower portion of the large bowel. This, pelvic nerve, as it is frequently called, contains apparently afferent as well as efferent fibres. Any lesions of the cord of sufficient degree above the third or fourth sacral will cut off all communication with the brain and result in retention of urine. When the pressure in the bladder is sufficient to force the sphincter the urine dribbles away and we have retention with overflow. On the other hand, if the cord is damaged at the third or fourth sacrat segments or the reflex is broken by a damage to the pelvic nerve in its intra-spinal course there follows complete incontinence with relaxation of the spincter and the urine dribbles away as fast as it enters the bladder. Similarly with the rectum, a high lesion leaves the reflex governing the internal sphincter intact, but if the sacral centre, or the nerves below, are destroyed the anal sphincter is relazed and patulous. As a rule then, there is retention of urine and constipation. A considerable number also suffer from abdominal distention. In part this may be due to the constipation but the chief factor is the disturbance to the sympathetic. Usually the skin area, which is paralyzed is dry, but in some instances sweating has been a marked feature. There is nothing characteristic about the pulse unless there is considerable shock. The temperature in cervical lesions is apt to be elevated a degree or two. Bed-sores are very common and appear very early. The usual sites are the sacral region and the heels. Priapism is often present, especially in lesions high up. It is never more, however, than a turgescence of the organ. If the intercostal nerves are involved there will be some respiratory distress and if the lesion is still higher and involves the diaphragm dyspnœa is very marked, coughing is impossible so that pulmonary complications are inevitable. A certain number have considerable vomiting, while, in a few instances, hæmaturia, which may be quite severe, is a troublesome occurrence. Kyphosis is an important sign. In the sixty-one cases it was present in twelve, or a little over twenty per cent., and it is noteworthy that in no instance does the history record a kyphus in the cervical region. In dislocations or fracture dislocations of the cervical region the position of the head its characteristic. If unilateral the head is turned to the opposite side but approximates the shoulder of the same side. If the displacement is symmetrical the chin is approximated to the sternum. In either case the patient, if walking, tends to support the chin and has difficulty in extending the neck. Cervical lesions are very apt to destroy the pupillary sympathetic fibres in which case there will be a small pupil which wont dilate with cocaine, flushing and loss of sweating narrowing of the palpebral fissure and enophthalmos. A transverse lesion involving the cord at or above the fourth segment is usually immediately fatal owing to paralysis of the diaphragm. In a small percentage of cases there is an associated cerebral lesion which renders the patient unconscious. As a rule this lasts at most a few hours, although in one instance in this series it persisted for nine days.

In determining the site of the lesion in the cord there are three ways by which this may be approximately ascertained. First, by noting the exact position of the deformity when present or the point of maximum tenderness. Second, by a careful study of the sensory changes, and lastly, by the paralysis. In arriving at a conclusion from the bony lesion it must be borne in mind that the cord segments do not coincide with the lips of the corresponding spinous processes, the former being located at a higher level as pointed out earlier, so that in the cervical region we must add one to the number of the spine, in the upper dorsal two and in the lower dorsal three to obtain the number of the subjacent cord segment. The lumbar enlargement from which the lumbar and sacral plexuses are derived lies opposite the spines of the tenth, eleventh and twelfth thoracic. There is a further source of error in that segments of the cord situated above those opposite the fracture may have been more or less destroyed by hæmorrhage into its substance and cases occur in which the bone is injured in the lumbar region and the paralysis and sensory loss correspond with a transverse lesion of the cervical enlargement. In such an instance the only possible explanation is that hæmorrhage has occurred into the cord above and probably due to acute flexion of the neck at the time of the fracture lower down. Hæmatomyelia with the characteristic areas of dissociated anæsthesia is sometimes produced in this way. There is another possibility of error more particularly in the lower part of the cord and this observation applies equally to tumours. If the injury be sufficiently violent to sever the cord it will at the same time crush the long anterior and posterior roots as they proceed downwards to leave the canal by the intervertebral foramina. Consequently, the clinical picture will be that of a complete lesion at the level of that segment from which the highest series of destroyed nerves came. In the cervical region additional information may be obtained by an examination of the pharynx as it is possible to palpate the upper four cervical bodies.

Sensory changes give us the most reliable means of localizing the seat of trouble in the cord. It has been shown by Sherrington that each area of skin is supplied by three cord segments so that if it is desired to anæsthetize a given area two posterior roots must be divided. It follows, therefore, that the upper border of anæsthesia points to a lesion of the next higher or perhaps the second higher segment than that represented by the level of the anæsthesia. It also follows that the anæsthesia in the upper limit is never so profound as that lower down since there is always an area receiving a partial supply from the undamaged segment above the lesion. Frequently, there is a band of hyperæsthesia of variable width above the anæsthesia. This may be due to irritation of the posterior roots or possibly to an irritative condition of the cord immediately above the lesion, whereby ordinary sensations are felt in an exaggerated degree. Sometimes the level of the anæsthesia is higher than one would expect from the paralysis and at the same time the symptoms suggest a complete transverse lesion. In such a case it probably means that the posterior roots have been crushed as well and therefore a very severe lesion.

It is not my intention to tabulate the sensory areas of the different cord segments as every text book on neurology has such a chart. In comparing these, however, one observes that no two are alike. As a matter of fact this is what one would expect seeing that in most cases the conclusions were drawn from clinical observation and consequently the exact limits of the lesion were not accurately obtained. The different cord segments are not demarcated one from another, so that a difference in the anæsthetic field must result if the lesion ended at the lower as compared with the upper limit of the segment. Then in certain areas the cord segments are very short, as in the lumbar enlargement and here it is difficult even to determine the limits of the segments so that it is not to be wondered at that the greatest variation as to sensory distribution is found in the parts supplied by the lumbar and sacral plexus. Possibly, too, all individuals have not the same sensory supply. In any case it is well to remember that the lesion is higher than we expect.

Paralysis is always a prominent symptom. It is always of the flaccid type and in complete transverse lesions remains so. Here, too, charts have been prepared indicating the segmental origin of the various muscles and here again there is considerable differences of opinion. But each cord segment contains motor nuclei for several muscles and at the same time every muscle is supplied from at least two segments which are not necessarily contiguous; consequently, it is not difficult to see why there should be considerable variation in the published tables.

While it is undesirable to detail the clinical picture of lesions in each segment, there are certain common types that may, with profit, be mentioned. Of the cervical injuries the vast majority involve the fifth and sixth vertebræ, giving rise to two types of anæsthesia, depending upon whether the upper or lower part of the cervical enlargement is involved. In the former the anæsthesia extends from the second rib down, including the arms. Breathing is entirely diaphragmatic and the shoulders can be shrugged. In the latter the anæsthesia starts at the nipple line, but is incomplete in the arms which are usually sensitive on the outer side. The shoulder muscles and flexors of the forearm escape which allow the hands, which are paralytic, to be placed on the chest, a characteristic attitude assumed by these patients.

In the dorsal fixed area there is nothing of special interest except that it is here that one usually meets with the Brown Seguard type of paralysis. This unilateral lesion results in paralysis with rigidity and increase in the tendon reflexes and often hyperæsthesia on the side of the traumatism with loss of touch, pain, heat and cold on the opposite side below the damaged segment.

In the lower part of the spine the majority of the fractures, over sixty per cent. in this series, involve the twelfth dorsal and first lumbar vertebræ, so that the lumbar enlargement is commonly the seat of the lesion. Here one meets with two types depending upon whether the upper or lower part of the swelling is the seat of the trouble. In the former the paralysis includes the lower abdominal wall and the parts below while the anæsthesia starts at Poupart's ligament. In the latter the paralysis is from the knee down, while the anæsthesia takes in the foot and leg proper with a band running up the back of the thigh and including a saddle-shaped area about the buttock.

Lastly, there is the type of paralysis caused by an injury to the canda equina. Any bony injury below the first lumbar body may damage the leash of nerves streaming down from the lower end of the cord. Obviously, it is difficult to distinguish such an injury from one of the cord since they all have their origin from the lumbar enlargement. When the canda is injured it is the most central nerves which suffer and these are the sacral branches and the paralysis affects the feet and peronei while the anæsthesia is limited to a saddle-shaped area on the buttock and about the anus and on the back of the scrotum. As in all the other types there is involvement of the bladder and rectum.

In differentiation from a low cord lesion, pain is of value and, if severe, is in favour of canda trouble. In a cord lesion the symptoms are more apt to be symmetrical and bed sores are more likely to develop. With such a picture, if the

x-ray shows a fracture below the level of the cord, a lesion of the canda equina is in all probability present.

The prognosis in spinal cord injury is bad.* It is usually stated that the higher the injury the worse the outlook. Certainly this is true for the upper four segments of the cord, but leaving these aside the mortality in this series was highest in the dorsal region. Three patients died on the day of admission—ten died within the first week, while seventeen died within the first three weeks. In other words, seventy per cent. died within the first three weeks. On the other hand, there are instances where the patient with paraplegia from injury has lived as long as eighteen years. In one institution in Toronto there are at present twenty-six cases of cord injury, the result of the War, varying from four years' duration or more. Last year there were five deaths. It is apparent, therefore, that if the patient survive the first three weeks the possibility of living for a considerable time is good.

In discussing the treatment of spinal injuries, very little need be said about those instances in which the cord has escaped as ordinary surgical methods apply. Fracture of a spinous or transverse process requires rest sufficiently long to ensure complete repair and then followed by exercises devised to cause movements of the damaged area. In the more severe type, where the centrum has been partially compressed, but where the cord has escaped the recumbent posture on a mattress beneath which a fracture board has been placed is indicated. Later the patient may be allowed up, wearing a plaster jacket or other supportive brace. In this connection one might point out the advisability of having every severely injured back x-rayed, as it is not an unusual experience to find that what was being treated as a sprain was in reality a severe bony injury.

When there is an associated paralysis the problem is an entirely different one. If it be first aid that is being administered to an individual with a broken back the greatest care must be taken in moving him lest a cord, not yet damaged, be injured or, in the latter event, to obviate further destruction. Under no circumstances should any attempt be made to elicit crepitus except possibly in a local spinous process fracture where no harm could result. If there is, in addition, unconsciousness, still more care must be exercised since muscle protection is to a great extent gone. Since an x-ray is essential, there will be less disturbance to the patient if this be taken before putting him to bed. If possible a water or air mattress should be provided to avoid, as far as possible, the development of pressure sores. Good nursing is here of the first importance and the utmost care should be taken to keep the sheets dry and free from wrinkles or bread crumbs. Should they develop they are treated upon general lines and, though very slow, large areas will usually heal over in the course of six or eight months.

With the patient in bed, the next consideration is the condition of the bladder and rectum. In the great majority of instances there is constipation and enemata must be administered. The bladder will, in all probability, be found distended. There are three methods of dealing with this condition. In the first the bladder is allowed to distend and overflow into a receptacle, pressure being applied above the pubes from time to time, or various areas stimulated to aid in the expulsion if necessary. In the second the catheter is used at regular intervals and the urine withdrawn under the most rigid asepsis. In the third a supra-pubic cystotomy is done and a tube inserted. A Sprengel pump is subsequently attached and the patient kept dry. The advocates of the first method claim that there is less danger of cystitis if the catheter is avoided, but I have had but little personal experience with the method. The second plan is that usually adopted, but it may be taken for granted that no matter how carefully the catheterization is done, it is only a matter of time before there is urinary infection. But the severity of the bladder infection is very variable, some having a great deal, others little, and it depends largely upon the natural resistance of the patient. If life is prolonged sufficiently the bladder reflex very often comes back, provided, of course, the reflex arc is not destroyed, and the infantile condition obtains whereby at certain more or less regular intervals the bladder empties itself, but without the knowledge of the patient. It is unusual for this to occur under six months. The third method has few advocates as a primary procedure, but may have to be adopted later in those instances where there is increasing difficulty in passing the catheter or where the cystitis becomes so severe that the sloughing masses cannot be removed through the catheter. The bladder tends to contract, but it is surprising to find how much urine some of the bladders with suprapubic drainage even will hold and that after a period of three years.

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*Rapid wasting and loss of tone in the muscles are indicative of a severe lesion.

Infection in the kidneys supervenes soon after the bladder is involved and this again is not the serious complication that we have been led to imagine. From time to time the patient will have a chill or a feeling of chilliness, some rise in temperature and pulse, with loss of appetite and frequently vomiting and in a few days he is himself again. He will never, of course, recover, but he may live in comparative comfort for years with a chronically infected bladder and kidneys, especially if he avoids the formation of calculi which are liable to form. There died in Toronto during the influenza epidemic a man who had been paraplegic for eighteen years and whose urine was never free from pus during that time.

The treatment of the local condition is one on which, from the perusal of text books, there is still a considerable difference of opinion. Roberts and Kelly, for example, give a list of fifteen indications for and against operative treatment, nine being for and six against interference. Most other writers are more conservative. The reason for such widely different views is, I believe, the failure to properly appreciate the pathology of the nervous lesion and secondly, the reported instances where operation has apparently cured cases where the cord was completely severed. There are three ways in which the cord may be injured in a fracture dislocation. It may be stretched or crushed between two hard substances or hæmorrhage with a following traumatic œdema may occur into its substance, or what is most common crushing and hæmorrhage are combined. That part of the cord which is pulped is destroyed forever and no regeneration whatever will take place. But while most lesions are transverse, the majority are incomplete and the improvement which follows is due to the gradual absorption of the exudate which occurred into that part of the cord which escaped destruction. A common indication for operation in text books is incomplete destruction and yet to operate early as soon as the shock has passed, but in any considerable damage to the cord there is sure to be complete paralysis for several days and it will be impossible from the clinical picture during the first fortnight to say how badly the cord has suffered. It may be taken for granted, too, that in a fracture dislocation where there has been any considerable displacement the position of the fragments when the examination is made is different from that at the time the crushing took place, for a certain amount of recoil is inevitable and it may even be complete. In other words, the damage was done at the time and bony pressure on the cord is so rare, as to be negligible. Bowlby's series of twenty-one autopsies showed no instance of pressure by bony spicules or narrowing of the canal. It follows, therefore, that operation to relieve pressure upon the cord is not indicated and in the majority of cases adds more trauma to the already damaged cord. True, there are cases of complete severance of the cord cured by operation reported in the literature. Stewart and Harte, in 1902, reported the case of a man whose cord was severed by a bullet and a three-quarter inch gap closed by suture, so that in sixteen months he was able to walk fairly well and had control of his urine, and there are others of a similar nature. But on scrutinizing these reports we find that they behave like so many unoperated cases that we are forced to the conclusion that an error in observation has been committed, supported as we are by the undoubted fact that the cord in man, at least, will not regenerate. The literature, too, contains many reports of improvement following interference upon cases where various operations were performed, such as the removal of a small blood clot from the dura or the excision of a depressed lamina or the removal of a subdural hæmorrhage, but a critical examination of these reports fails to convince one that any good whatsoever resulted from the operation and that any improvement which followed was due to the natural absorption of exudative products. Extra or intra dural hæmorrhage in themselves never call for operation and in themselves produce only transient symptoms. If there is paralysis, one may safely say an intramedullary lesion exists in addition. In short, there is only one positive indication for operating upon a spinal cord injury and that is where the damage has been to the nerve roots making up the canda equina. If a stereoscopic x-ray shows spicules penetrating the cord it is justifiable to remove them, but too much must not be expected from the operation. In military surgery there were only two generally recognized indications for operation, first the presence of a foreign body lying within the canal, and second, where the man suffered very severe pain indicative of a root lesion. In a canda injury, however, one is below the cord and is dealing with structures which are known will regenerate and therefore come into the class of peripheral nerve surgery. As there are no sure means apart from actually seeing the nerve by which in the early stages we can be certain that it is completely divided so in lesions of the canda, so that time must be given for incompletely divided roots to recover. If then, there is evidence of complete root division operation should be undertaken. Tuffier, during the great War, successfully performed this operation and, so far as I am aware, it is the only case on record where it has been accomplished in man. Naturally, the operation is a difficult one since the anterior surface of the intervertebral canal is about three and a half inches from the dorsal surface of the body and, at best, the opening into the canal cannot be made more than three quarters of an inch wide. But it offers the only possible hope of recovery and there is very little danger if properly performed of doing further damage.

In this series there were fifteen operations, none of which were upon the canda, with two deaths. One followed the close of a laminectomy and the other manipulation of the cervical vertebræ under an anæsthetic to determine the existence of a fracture. The immediate mortality was consequently very low, namely, thirteen per cent., as compared with a forty per cent. mortality in sixty-four cases reported by Hahn, and a thirty-nine per cent. in Chipault's one hundred and sixty-seven cases. In each series are cases recorded as cured or improved, but I am convinced that the natural tendency to a certain degree of recovery will explain them all.

Lastly, there are the cases of dislocation or fracture dislocation in the cervical region. Again the text books contain descriptions of the various methods to overcome the deformity. In my opinion they are all dangerous and have done more harm than good. If there is paralysis reduction will not render this less, and if there is none the patient should not be subjected to manipulation which is liable under the best of conditions to render him a cripple for the rest of his life. If paralysis is present the case is treated in the ordinary way, but if the cord has escaped, the neck is placed in plaster of paris and immobilized for at least two months. Often there is a great deal of radiating pains for weeks, but these tend to disappear as the months go by.

We have much pleasure in calling the attention of our readers, who are interested in all the various phases of the important department of public health and preventive medicine, to the change of scope in the well-known journal, *Modern Medicine*, which also changes its title to that of *The Nation's Health*. From a publication devoted to clinical medicine, it becomes a health magazine of broad national service. A magazine which hopes to be the organ of the American Association of Industrial Physicians and Surgeons, and one in which the many problems of industrial medicine will receive scientific attention. Community health including organized health activities, public health nursing and sanitation in its broad aspects, will be kept under consideration with emphasis upon the practical methods for the prevention of disease and the promotion of general health and physical efficiency as worked out by experience throughout the country. Problems of infant welfare and child health, particularly the health of school children, will be specially emphasized.

Institutional health, including physical care, health service, and medical attention in institutions, boarding schools, and colleges, will be given the attention which the importance of health problems in such institutions deserves.

DENTAL INFECTION AND INTERNAL MEDICINE

SIDNEY J. S. PEIRCE, M.D.

Brandon

IT is generally accepted by both dentists and medical men, and is gradually being realized by the laity, that dental infection is associated with many symptoms other than toothache. Indeed at the present time the dental abscess is being accredited with a great variety of conditions from alopecia to bunions. There is danger of drawing loose conclusions from isolated cases. A valid estimate can be made only from a fair sized number of unselected cases in which the teeth have been investigated by radiophotographic methods, the symptoms recorded impartially and the general physical make up of the patient subjected to a thorough revision.

For the purpose of the present study, one hundred consecutive cases have been selected in which complete dental films were available. The *x*-ray findings were recorded and the symptoms complained of tabulated under the following general headings: Respiratory, Circulatory, Gastro-intestinal, Genito-urinary, Nervous, Skeletal and Cutaneous. The presence of other foci, in tonsils, nasal sinuses, appendix or gall-bladder and evidence of tuberculosis or syphilis were also recorded.

The *x*-ray findings were seen to divide the cases into three main groups (a) apical abscesses, (b) general alveolar absorption, (c) negative cases. The remainder, forming a heterogeneous group, showing a variety of findings such as unextracted roots, unerupted teeth, necrotic centres, etc., were discarded for the purpose of this study.

The number in each group were as follows: (a) Apical abscesses, forty cases; (b) General alveolar absorption, twenty-five cases; (c) Negative, twenty-two cases.

The percentage of cases of each group which present symptoms referable to the various systems indicated are shown in the following table:

	A	*B*	*C*
Nervous	57%	52%	27%
Skeletal	45	32	18
Cutaneous	17	24	9
Gastro-intestinal	42	32	54
Respiratory	12	0	5
Genito-urinary	17	4	22
Circulatory	5	4	27

In groups A and B, there is a great preponderance of symptoms referable to the nervous and skeletal systems. Of the former class chronic neuralgias often of the trunk or extremities are characteristic and in the latter class the chronic backache traceable to spondylitis of the lower dorsal or lumbar vertebrae is a frequent finding. Skin symptoms, in particular chronic eczemas in the region of the face, show a well marked preponderance in the groups showing positive dental findings. There is apparent, in the present analysis, no relation between dental infection and gastro-intestinal symptoms, but an inspection of the case-histories in the positive dental cases leaves one with the impression that there is commonly in these cases an irritable condition of the gastro-intestinal tract comparable to the irritable conditions of the skin seen in other cases, as not infrequently one finds gastro-intestinal symptoms complained of which find no explanation in the subsequent *x*-ray examination of the gastro-intestinal tract. Respiratory symptoms are more than twice as frequent in the dental abscess cases than in the negative cases. The difference is made up by the presence of cases of asthma in the first group.

The result of tabulation of associated foci of infection is shown in the following table:

	A	*B*	*C*
Infected Tonsils	15%	20%	14%
Infected Sinuses (antra)	25	20	14
Infected Gall-bladder	10	0	9
Appendicitis	5	4	4
Tuberculous infection	10	8	9
Positive Wassermann	2 (doubtful)		

Résumé of address before Western Manitoba Dental Society, February 21st, 1921.

The only striking finding here is the not infrequent association of infected antra with dental infection.

Conclusion

Dental infection is associated with a train of symptoms related in particular to the nervous and skeletal systems; especially to various forms of neuralgia, periarthritis and spondylitis. In a less but still in a fairly obvious degree it is associated with symptoms related to the skin and the gastro-intestinal and respiratory tracts and would appear to be responsible for certain forms of eczema and other irritable skin conditions, for many obscure gastro-intestinal disorders and for certain cases of asthma.

The two conditions described by the radiologist as apical absorption (or abscess) and general alveolar absorption appear in the main to be associated with the same train of symptoms.

There is nothing in the present study to indicate that dental infection has any relation to malnutrition, nor does there appear to be any ætiological relation between dental infection and the graver forms of gastro-intestinal infection such as appendicitis and gall-bladder infection. Tuberculosis and syphilis do not enter into the problem.

Dental infection and infection in the accessory sinuses of the nose, particularly the antra are frequently associated and as the train of symptoms related to infection in these two sites is frequently identical it is unwise in investigating the one to overlook the other.

THE NATURE OF ACIDOSIS IN NEPHRITIS

Edward H. Mason, M.D.

During the past few years a more thorough understanding of the importance and frequency of acidosis in nephritis has been brought before the medical profession. We know to-day that in severe acute and chronic nephritis, acidosis is frequently extreme, warranting special therapeutic measures, and that not infrequently patients die in so-called "uremia", the immediate cause of death being acidosis.

The nature of this acidosis was first suggested by Marriott and Howland[1] as being due to an inability on the part of the kidneys to eliminate acid phosphate, resulting in an accumulation of the inorganic phosphates in the blood and tissue lymph. To neutralize this excessive retention of acid phosphate the bicarbonate reserve of the body is drawn upon, resulting in a lowered carbon dioxide tension in the blood. Such an acidosis, so frequently encountered in nephritis, is distinctly a "retention" acidosis, as distinguished from the acidosis, or more properly termed ketosis, found in diabetes mellitus, starvation and vomiting of pregnancy. The latter is a productive ketosis due to the inability of the body to completely oxidize the fat molecule, resulting in an accumulation of the three acetone bodies in the blood. In nephritis we frequently have marked dyspnœa due to the inability on the part of the body to maintain the normal ratio, $\frac{H_2CO_3}{BHCO_3} = \frac{1}{20}$, resulting in the blood containing more ionized hydrogen than normally. Such a condition is a decompensated acidosis. The degree of the phosphoric acid retention can be readily determined by the CO_2 tension in the blood, which we know decreases in proportion to the exhaustion of the alkaline reserve. Chace and Myers[2] have recently presented a small series of cases of chronic nephritis where the CO_2 volumes per cent. content of the blood fell to such low levels that the immediate cause of death was apparently due to acidosis.

The treatment of phosphoric acid retention in nephritis depends upon a passive restoration of the bicarbonate reserve by the administration of sodium bicarbonate by mouth, rectum, or by other channels, combined with the usual means of re-establishing kidney function. In most cases it is not difficult to raise the CO_2 capacity of the blood to a normal level, but it is more difficult to stimulate the kidneys to eliminate the retained phosphates. Frequently the therapeutic proce-

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From the Metabolism Clinic of the Royal Victoria Hospital, Montreal.

dure is of a temporary nature, as the lesion of a chronic nephritis showing acidosis usually has progressed to a contracted kidney, with loss of the ability to excrete the acid (NaH_2PO_2) from the alkaline phosphate (Na_2HPO_2). All alkali therapy should be properly controlled as it is not without danger. This applies especially when there is impaired kidney elimination. The danger is alkalosis associated with symptoms of tetany, and such findings have been reported by Harrop[3] with a plasma CO_2 of only 80 vols. per cent.

As a good example of the importance of phosphoric acid retention in chronic nephritis the following case is reported:

CASE NO. 156 (Metabolism). Admitted to the Royal Victoria Hospital February 14th, 1921, died March 1st, 1921, male, age twenty-six, student. The complaints on admission were headache, shortness of breath, vomiting, and general malaise. The patient had been in usual health until February 1st, 1921, when he had a severe attack of diffuse pharyngitis, associated with headache and fever; also marked prostration, palpitation and repeated nose bleeds. His family history was negative. In 1912 patient had an attack of acute nephritis following exposure. At this time he was in bed for four months. Since then he has had a persistent trace of albumen in his urine. Tonsillectomy was done in 1920. On admission the patient appeared severely ill, with face flushed, respirations rapid and laboured. The mouth was dry. There was tremour of the hands, and the mucous membranes were pale; no œdema; pulse 105; increased tendon reflexes. No pathological reflexes were present. The urine, obtained by catheter due to inability to void, was amber in colour, acid in reaction; sp. gr. 1013, albumen + +, sugar negative. Microscopic examination revealed a few white blood cells and epithelial cells, but no casts or red blood cells. Examination of the blood showed R.B.C. 3,200,000, hæmoglobin 85 per cent. (Palmer method). Blood pressure was systolic 96, diastolic 36. Examination of the eyes gave negative findings; examination of the stools also negative results. Chemical examination of the blood gave the following results: Blood urea, 3·72 grams per litre; creatinine, 10·8 mgm. per 100 c.c.; uric acid 13·8 mgm. per 100 c.c.; inorganic phosphates (as P.), 11·1 mgm. per 100 c.c.; blood plasma CO_2, 26·2 vols. per cent.

Treatment was instituted along the lines of stimulating the kidney function by forcing fluids and by glucose given intravenously to the point of a slight glycosuria. An attempt was also made to neutralize the existing acidosis with sodium bicarbonate.

The further course of the case is best shown in Tables I and II, which follow on next page.

From the above history and findings one would conclude that the condition was one of chronic parenchymatous nephritis with the kidneys markedly contracted (secondary contracted kidney.) Upon admission there was marked retention of non-protein nitrogen in the blood, as well as a retention of inorganic phosphates. The latter had resulted in a lowering of the plasma CO_2 to 26·2 vols. per cent. This acidosis was relieved by sodium bicarbonate, the plasma CO_2 rising to 47·7 vols. per cent. With this all respiratory symptoms disappeared. The volume output of urine was likewise increased up to a maximum of 2790 c.c. with a urea output of 22·1 grams per day. However, the specific gravity remained rather fixed. As seen from Table I, a marked anæmia developed which was improved by repeated transfusions of whole blood. With the neutralization of the acidosis little improvement in the retained phosphates was noted. The blood urea, despite all procedures, tended to rise steadily to the level of 6·18 grams per litre at death.

A few days previous to death the patient developed a cystitis, the white count rising to 31,800 on February 28th, 1921. Likewise there was a terminal bilateral parotitis.

Autopsy Report. Record No. 3828.

Anatomical Diagnosis: (1) Degenerative and productive nephritis (secondary contracted kidney); (2) Congenital aplasia of right kidney; (3) Acute exudative hæmorrhagic pericarditis; (4) Cystitis; (5) Parotitis.

Kidneys. Left. Weight, 50 grams. The capsule strips easily leaving a finely granular yellowish surface. On section there is marked atrophy of the renal parenchyma with increase of the peripelvic fat. Differentiation between cortex and medulla is lost and the kidney surface appears of a mottled yellowish pinkish colour.

Histology: The tubules are swollen and granular, desquamated in places leaving simply their outline with no epithelial lining. There is an increase in the amount of fibrous tissue and an infiltration with small lymphocytes. The blood vessels show thickened walls with medial hyaline changes and local spots of endarteritis. The glomeruli show beautifully a series of changes, beginning with slight productive ones with small round cell infiltration, progressing to contraction

TABLE I.

Date 1921	Intake		Output (urine)				R.B.C. per cmm.	Remarks
	Glucose intravenously grms.	Total $NaHCO_3$ grms.	Volume c.c.	Sp. Gr.	Glucose grms.	Urea. grms.		
Feb. 14.......	60	14	670+	1013	0	—	—	
“ 15.......	60	43	280	1014	1.3	—	3,200,000	
“ 16.......	30	46	730	1015	2.3	—	—	
“ 17.......	97·5	18·5	1650	1013	4.6	10.1	1,010,000	Transfusion 400 c.c. blood
“ 18.......	—	—	2060	1012	0	18.6	—	Transfusion 500 c.c. blood
“ 19.......	—	—	1790	1014	0	22.1	—	
“ 20.......	—	—	1720	1014	0	14.6	2,500,000	Transfusion 300 c.c. blood
“ 21.......	—	—	1060	1012	0	8.9	3,040,000	
“ 22.......	—	—	1150	1013	0	—	2,850,000	
“ 23.......	45	27	1100	1017	1.9	8.0	—	
“ 24.......	90	20	1420	1017	4.4	8.8	—	
“ 25.......	90	8	920	1017	3.1	7.2	2,080,000	
“ 26.......	—	—	1850	1015	2.1	16.5	—	Transfusion 840 c.c. blood
“ 27.......	90	—	1180	1016	6.2	10.4	—	
“ 28.......	90	4	150	1017	6.0	—	2,070,000	
March 1......	Died							

TABLE II.

Date	Blood					
1921	Urea. mgm. per litre.	Creatinine mgm. per 100 c.c.	Uric Acid mgm. per 100 c.c.	Plasma Chlorides grms. per litre	Inorganic Phosphates (as P.) mgm per 100 c.c.	Plasma CO_2 Vol. per cent.
Feb. 14..............	3·72	10·8	13·8	—	11·1	26·2
“ 15..............	3·63	—	—	—	—	29·0
“ 16..............	4·77	—	—	—	—	31·9
“ 17..............	4·77	12·0	19·2	5·2	7·3	35·2
“ 18..............	—	—	—	—	—	47·7
“ 21..............	4·77	18·4	18·2	—	8·0	40·0
“ 23..............	5·32	—	—	—	—	36·1
“ 24..............	—	—	—	5·6	—	46·8
“ 25..............	5·31	—	—	—	—	55·5
“ 28..............	6·18	15·0	17·6	—	6·97	35·7
March 1............	Died					

and thickening of Bowman's capsule, and finally to hyaline replacement of irregular areas of glomerular tissue to complete hyaline fusion.

Right: Weight, 10 grams. This kidney is very small, showing only a little parenchyma at the lower pole. The rest is represented by fibrous tissue. The pelvis is dilated to the size of a small plum and the ureter is slightly dilated.

SUMMARY

The case reported shows the findings so frequently encountered in the advanced stages of secondary contracted kidney. As shown at autopsy the therapeutic procedures simply prolonged life. The case demonstrates quite well the severity of the acidosis present, associated with the retention of inorganic phosphates in the blood. Despite all therapeutic procedures the blood urea rose steadily till death. It was the most constant finding, and apparently of the greatest prognostic importance.

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FRAGILITAS OSSIUM

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OSTEOGENESIS imperfecta is a rare system disease of unknown origin characterized by imperfect development of bone. Clinically, it is manifested by multiple spontaneous fractures and it occurs in two forms osteogenesis impe - fecta congenita, and osteogenesis imperfecta tarda. The name was coined by Vrolik in 1845 and since that time various other names have been suggested from amongst which, one stands out pre-eminently viz: Fragilitas Ossium. These two terms are practically synonymous and are both equally useful in that they suggest nothing but a clinical picture and do not pre-suppose any knowledge of the underlying cause. For the sake of increased clarity, osteogenesis imperfecta might be applied to those cases which occur in utero, or in early infancy, and the term fragilitas ossium confined to cases occurring after the second and third year of life. On this account, the cases here reported have been called fragilitas ossium.

The direct cause of the disease is not known. Griffith estimated an hereditary factor in 27 per cent. Neither sex seems especially prone to the disorder. The greater number of cases reported occur in very early life, and the earlier the condition appears, the more unfavourable the prognosis. Cases occurring after three or four years frequently go on to spontaneous cure. The condition does not appear characteristic of any particular race. It has been reported in coloured people as well as in white.

In bulletin number fourteen of the Eugenic Record Office, the following statements are made: "That the cause of the imperfect osteogenic processes is not the condition of the mother is proved by the fact adduced by Schwarz and Bass (1912, page 317) that, in one instance, one of twins showed osteopsathyrosis at birth and the other did not. That the cause is not due to the poor condition in later life is indicated by the circumstance that a bone fracture frequently occurs even in intra-uterine life, or while being born. Still another reason for denying to external conditions the sole cause of the irregular development is that the distribution of cases is not haphazard but generally runs in families."

The primary pathological conditions are of the same nature in all the bones of the body, which are either soft or brittle. There is a marked preponderance of medullary substance over spongiosa, and the lamellar process of the bone is less marked. The bone marrow is mostly fibrous, osteoblasts are markedly diminished in number. As a consequence of this abnormal state of the bony tissues multiple fractures occur on very slight provocation. Children suffering with this condition are usually mentally under-developed. Their skin is soft and delicate. The reason of this under-development and softness of skin has been explained as due to the restricted life resulting from fractures. A peculiar condition sometimes associated with fragilitas ossium is that of oto-sclerosis and blue sclerotics. The Currie family is the most noted example of this syndrome, the condition having been present irregularly through four generations.

Reference has already been made to the age at which fractures occur. The number of fractures that may occur is enormous, Chaussier having reported a case with one hundred and thirteen fractures. There is little pain associated with fractures. Healing is rapid.

In several of the reported cases the metabolism has been worked out. Calcium has been found to be slightly low; although retention of calcium was good. Cases of tetany with less calcium have no fractures. The non-protein nitrogen, fat, carbohydrate, etc., have been found to be normal.

Inasmuch as the disease is a constitutional one, all the bones of the body show changes in the skiagram. There is a deficient shadow formation due to increased permeability to *x*-rays. The cortex is of irregular thickness, but is on the whole very thin and parchment-like in appearance. The spongiosa contains wide meshes and an absence of structural markings. The medullary cavity is increased in size and shows irregularly mottled shadows. Some writers emphasize the amount of callus found at the seat of the fracture.

The condition must be distinguished from rickets and syphilis, and this is easily accomplished by the Wassermann test and x-rays.

Any surgical method of treating fractures may be employed. Frequently the fractures unite easily. However, often the next fracture occurs in a short time and the surgeon soon tires of treating fractures which recur with such rapidity. Certain cases go on to spontaneous cure, and the older the child is when the first fracture occurs, the more hopeful is the prognosis. Thyroid, parathyroid, pituitary, thymus, pineal gland and adrenal have been tried separately and in combination without noticeable success. Fresh air, good food and codliver oil is indicated in all cases. Phosphorus may be combined with the codliver oil. Calcium has also been freely administered with a view to increasing the amount of calcium in the blood, but its effect appears to be purely temporary.

The cases here reported are of interest because of the inbreeding of the parents. No new strain has been introduced in three generations.

Report of Cases

The first case referred to was in the Montreal General Hospital under the charge of Dr. A. Mackenzie Forbes and Dr. F. G. Finley. Later the two cases were in the Children's Memorial Hospital in the service of Dr. Forbes, and as a result of his suggestion are reported:

L. M.—Aged ten years.

Complaints—frequent fractures.

P. H.—Eldest child. Normal delivery. No forceps. Breast fed till twelve months. First tooth at age of eleven months. While still being breast fed he developed pneumonia. From this time till he was two and a half years old had "convulsions" which occurred approximately every two weeks.

Mother said she had no trouble weaning him.

Commenced to walk at twenty-four months. Bow legged and used to sweat a good deal at night. Stomach was big. At age of twenty-six months slipped on a mat and broke his right thigh. This was put up in plaster paris for six weeks. Three months later he fractured the left thigh and this extremity was in plaster paris for two months. Each femur is said to have been fractured ten times in the last eight years. The fractures always occurred alternately in each leg except the last time when he fell out of a toy automobile and so fractured the same thigh twice in succession. At the age of five, while crawling on the floor he fractured the left humerus. He has had measles, whooping cough and diphtheria. Tonsils were removed two years ago.

F. H. There is nothing of interest in the family history except the extraordinary form of intermarriage which resulted in the birth of the patient. The mother of the patient at the age of twenty-two years married her uncle (her mother's brother) he was then twenty-three years of age. Patient's grandmother has four other brothers beside the one his mother married. All those four brothers are married and have healthy children. None of them married relations. The mother of the patient has two sisters and they married outside the family and they have healthy children (no fractures.) The patient's maternal grandmother also married her maternal uncle. The patient is the eldest child and was born one year after marriage of parents. He has a brother with the same complaint and a sister between himself and this brother and she has never had any fractures and has always been well.

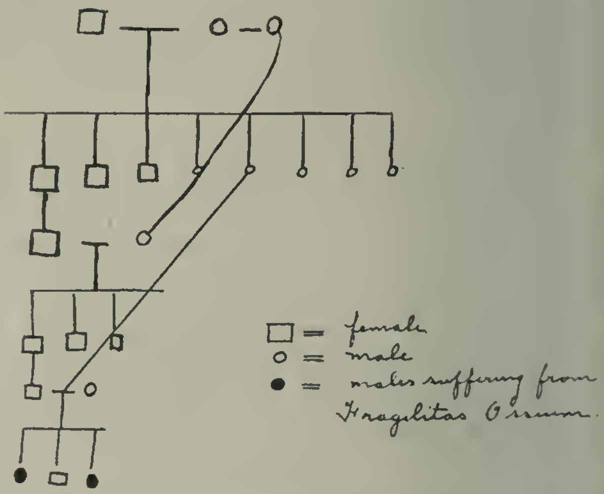
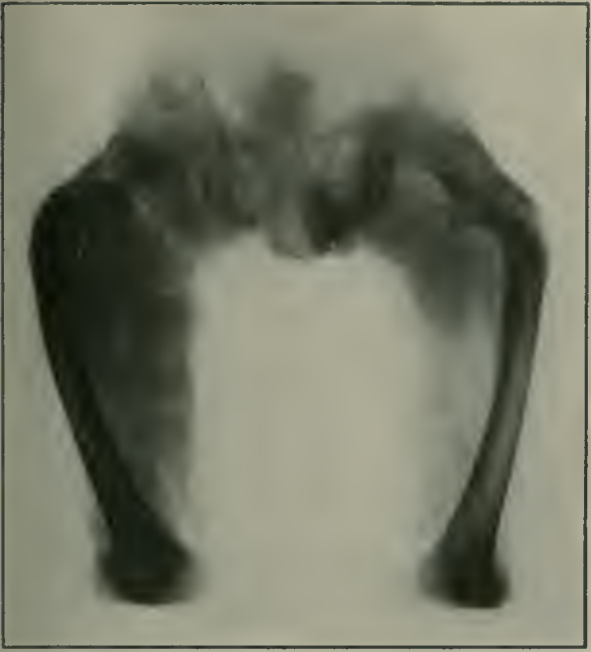


Chart illustrating the extraordinary form of intermarriage which resulted in the birth of the two boys.

Examination. Rather fat boy, considerable panniculus. Face pale and pasty; mucous membranes anæmic; hands broad, but bones well formed and apparently normal. Long scar on front of left leg; leg slightly shortened; teeth good; throat slightly reddened; the isthmus of the thyroid palpable; no other glandular enlargements. Heart, lungs abdomen and other systems apparently normal. Urine:—1020-1030. Acid-clear amber. No albumen. No sugar. Microscopic examination negative; crystals of calcium oxalate were noted on one occasion. The blood count showed red blood cells 4,260,000; leucocytes 10,400; hæmoglobin 70 per cent. Smears normal.

Wassermann.— 4-3-20 O. (small specimen).
8-3-20 trace
10-3-20 O.



Both femora form arch with shaft just below lesser trochanter, neck of bones horizontal, shafts vertical. Bone thickened with obliteration of medulla just below lesser trochanter giving the appearance of an old fracture, particularly so on the left side. Cortex narrow.

Report of Dr. Rabinovitch on Metabolism. There is no disturbance in nitrogen or salt metabolism Output of calcium is equal to or faster than intake. Blood calcium slightly low. Résumé: Intake N 6·51. NaC 6 grms. CaO ·970. MgO Carbo-hydrate: There is no disturbance in carbo-hydrate metabolism. No glycosuria; no polyuria occurred. Blood sugar never reached the upper level and returned to the original level in less than three hours. Calcium Metabolism: Total intake of calcium ·913 gms. Total output of calcium ·324 gms. in urine In stools, total of ·794 gms., leaving a balance of ·149 gms. Blood calcium 6.0 m. gms. per 100 c.c. Spinal fluid calcium 6·1 m. gms. per 100 c.c.

M. M., aged seven years. Born in Sydney, N.S. He was the third child: normal delivery; no forceps; nursed eleven months. First tooth at the age of ten months. No trouble weaning. Mother says he was never a strong child. Fed on half milk and half water with a little sugar. At age of one and a half years barley was added to the diet. This was gradually changed to an ordinary diet, the same as that of the rest of family. Mother says legs were perfectly straight, and that he started walking at eighteen months. At age of three and a half years fell from a gate and broke right leg, which was in plaster paris for six months. About three months later fell on kitchen floor and broke the other leg; since then has broken legs about eight times, always alternately. On one occasion broke left arm. He had measles at age of five years; whooping cough at age of three years. Two years ago tonsils removed. The last fracture occurred in March, 1919.

F. H. Same as Louis. Physical examination is not recorded as nothing of any note was found and in all essentials it is similar to that of his older brother.

Discussion. The cases reported are of interest because of the extraordinary form of intermarriage which resulted in the birth of the two boys —the sister escaped.

In the first case, the history of convulsions in infancy suggests the possibility of tetany. Late dentition, head sweating, deformity of legs, prominence of abdomen make it evident that rickets was also present.

The second case had perhaps a slight degree of rickets, but no evidence of tetany, and there is no reason for supposing that tetany or rickets are of ætiological importance, although they may be associated with the condition under discussion. No fresh knowledge has been gained from the physical examination, *x*-rays, metabolism or clinical laboratory findings.

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NOVOCAINE IN SURGICAL OPERATIONS

A Clinical Report of 459 Operative Cases in which Novocaine was used as a Local Anæsthetic

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Brandon

THE report here submitted refers to a number of cases that have occurred in the surgical experience of Dr. W. A. Bigelow and the writer during the past few years, and in which the use of novocaine local anæsthesia has been found very satisfactory. It is not our desire to present a plea for the exclusive use of local anæsthesia in surgery, yet we feel that our results justify a wider use of this form of anæsthesia than is perhaps generally appreciated. A study of our cases, four hundred and fifty-nine in number, has been made, due consideration being given to its advantages and disadvantages. The cases studied do not include very minor ones such as office operations, nor do they include excision of superficial tumours, circumcisions, tonsillectomies, amputation of fingers and toes, simple laparotomies for tuberculous peritonitis, gall bladder drainage, or emergency work in case of acute bowel obstruction, but comprise those operative procedures where general anæsthesia has been and is now more or less extensively used.

Local anæsthesia in all our cases was produced by the use of a solution of one-half to one-quarter of one per cent. novocaine, combined with varying amounts of adrenalin solution, 1-1000. The quantity used varied from a few drachms to twelve ounces. We have had no trouble with toxic symptoms produced by large doses of novocaine as far as we know. In fact, we do not know its full dose. We never hesitate to use large quantities of the solution, but are careful during the infiltration to keep the needle constantly on the move, thus changing the situation of the point to prevent the accidental injection of any great amount into a blood vessel. A few cases have been reported by others of trouble caused by the intravenous introduction of novocaine, but this is avoidable.

Local anæsthesia in these selected cases was chosen in preference to general anæsthesia for a number of reasons. It is a well-known fact that patients fully realizing the importance and necessity of operative treatment often delay on account of the fear of a general anæsthetic. When the patient can be assured that it is not necessary to be rendered unconscious, that he may converse with the operator during the operation, tell stories or exchange adventures, that there is no post-operative vomiting, no fear of post-operative inhalation pneumonia, and that at the same time all sense of pain in the operation area is abolished, the fear of operation pales, and the patient approaches the operation with greater confidence and with less fear and trembling. Especially is this so in hernia and hæmorrhoid cases, many of whom in this series had been sufferers of such conditions for years simply because they dreaded the general anæsthesia. True, in spite of this assurance some still entertain the traditional fear of the theatre, but this can be palliated or entirely overcome by a preliminary hypodermic of morphia.

Again, with those patients, who, after examination are found to be presumably bad risk for a general anæsthetic, whether it be due to an associated pathology in the heart, lungs, kidneys, or elsewhere, the use of the local anæsthesia allows the operator to approach his work with greater confidence, and no fear of the possible complications arising out of general anæsthesia.

The comparative hæmostasis produced by local anæsthesia aids greatly in allowing the operator to identify readily the various structures as he proceeds.

Dissections of fascial or other tissue planes is greatly facilitated, especially where a good infiltration anæsthesia has been done. This advantage has been appreciated in the case of hernioplastics and perineorrhaphies.

Possibly one of the greatest benefits of the use of local anæsthesia from the surgeon's standpoint

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Read before Surgical Section at Dominion Medical Convention, Vancouver, June, 1920.

is that it precludes rough handling and cultivates in him a healthy respect for living tissue, a lightness of touch, and a gentleness of procedure, all of which are so necessary in successful surgery. It is possibly on account of this minimal amount of trauma done that such good results in the healing of the wounds were experienced in this series of cases. The wounds healed apace with operation wounds made the same day in other cases done under general anæsthesia, and never in any case was there any reason to ascribe delay in healing, or infection, to the use of the local anæsthetic.

HERNIÆ—158 cases.

The largest group in this study of cases consisted of herniæ, of which there were one hundred and fifty-eight. Of these, one hundred and twenty-eight were inguinal, eighteen were femoral, and the remainder old post-operative ventral. The degree of pain experienced is the index of the efficacy of any form of anæsthesia, and we wish to state that with a little knowledge of nerve supply, coupled with care in the preparation of the novocaine solution and its administration, the operation for the repair of hernia is painless after the first insertion of the needle. Hard rough traction productive of pain, and which is avoidable, must not be charged against the anæsthesia. Again, it was found important to include thoroughly in the infiltration the subperitoneal tissue, as it is through this area that the peritoneum derives its sensibility, the visceral surface being totally insensitive.

In an ordinary hernia we use four to five ounces of the solution. If the hernia is double we use double the quantity, as in all such cases, whether inguinal or femoral, we repair both sides at the one sitting.

In strangulated hernia we have felt particularly encouraged in the use of novocaine anæsthesia, presenting as it does the following distinct advantages:

First, no further shock is added to the patient's pre-operative condition.

Second, when in doubt as to the integrity of the strangulated portion of bowel after its release we have been able to take our time and apply warm saline compresses to the discolored gut during periods varying from one-half hour to four hours in one extremely bad and doubtful case where we fortunately did not have to resect. In three cases, however, this was not advisable, and resection was done painlessly.

Third, it has been noticed that the coverings of the hernial sac are less sensitive than in non-strangulated cases, due no doubt to pressure anæsthesia, and a minimal amount of infiltration is required.

So much interested are we in the use of local anæsthesia for hernia operations that we are now trying to do nearly all of such cases in this way. Its use has been in all cases gratifying to the patients, and in fact in many instances is requested.

The patients ranged in age from twelve to eighty-two years. The boy of twelve referred to was a manly little chap, who three weeks previously had had a tonsillectomy done under general anæsthesia, and when an option of local anæsthesia was presented to him for the repair of his hernia he quickly decided that he would take no more ether. After his operation, and while being wheeled into his ward, he remarked, "If I ever need to have any more operations that is the way I want them done." We have had no experience with children under that age. The other extreme of age was in an old man of eighty-three with a strangulated inguinal hernia. On account of his general condition it would have been utterly impossible to have used a general anæsthetic, and under the use of novocaine a herniotomy was done, the hernia repaired, and the man enjoyed life another four years.

Briefly the technique in inguinal hernia is as follows as shown in Plate 1.

At a point about three-quarters of an inch internal to the anterior superior spinous process

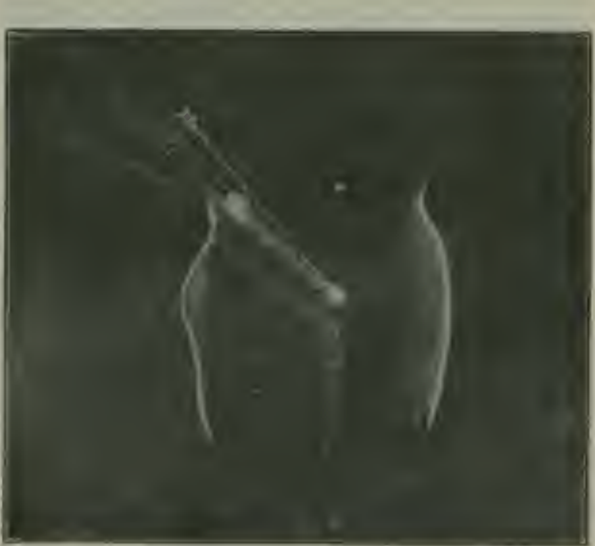

PLATE I.

of the ilium an intra-dermal wheal is made using an ordinary hypodermic syringe and a very fine needle. Through this wheal a long slender needle attached to a 10 c.c. glass syringe is inserted and piercing the subcutaneous fascia one can readily feel the point engage the resistant aponeurosis of the external oblique. This latter layer is pierced and a copious infiltration is made with the object of blocking the ilio-inguinal and ilio-hypogastric nerve trunks. This infiltration is continued downwards and inwards along the line of the proposed incision to the level of the external ring. In this latter area a thorough infiltration is made including the tissues of the cord. The infiltration extending along the line of proposed incision is made at varying depths so as to insure superficial as well as deep anæsthesia. This anæsthesia allows incision sufficient to expose the spermatic cord and the sac of the hernia. Further injection is required with a fine needle to anæsthetize the genital branch of the genito-crural nerve high up in the cord so that the latter may be painlessly dissected from the sac. It is also advisable to infiltrate the sub-peritoneal tissue at a slightly higher level than the neck of the sac so that the latter may be isolated thoroughly preparatory to ligation.

Hæmorrhoids—91 cases.

The second group in which local anæsthesia has been tried out comprised 91 cases of hæmorrhoids. This operation is absolutely painless after the first prick of the needle. Associated with hæmorrhoids various other rectal conditions were treated, such as fissure-in-ano, rectal polyp, and fistula-in-ano. In the more simple cases this latter condition is readily taken care of under local anæsthesia, but where there is multiple tunnelling or the presence of acute infection, general anæsthesia was considered preferable. In a considerable number of cases there seemed to be more post-operative pain with local anæsthesia than in those done under a general anæsthetic. This disadvantage can be readily met by a hypodermic of morphia.

Plate II.

The technique as illustrated in Plate 2 is as follows:

After the pile has been demonstrated a small needle is used in anæsthetizing its mucocutaneous base. Through a wheal so formed the needle is inserted deeply into the base of the pile and half a drachm or more of the solution usually suffices for this infiltration and allows the operator to make the necessary dissection and to apply the ligature. To render the first prick of the needle comparatively painless we often apply a drop of pure carbolic acid on a probe to the site of injection.

Appendiceal Operations—23 cases.

This group of twenty-three cases consisted of both chronic and acute types, as well as abscess cases. In six of these cases appendectomy was done either deliberately through a McBurney incision, or while repairing a hernia, the appendix having appeared in the sac. Our experience in such cases would suggest the use of local anæsthesia only in those well walled-off abscess cases, where the patient is extremely toxic, or where the condition is complicated with a bronchitis or a pneumonia. In all other cases of this type we prefer a general anæsthetic.

Colostomies—15 cases.

This operation was painlessly done in each of the fifteen cases of this group. The indication for the operation in all the cases happened to be for obstruction due to carcinoma in some part of the colon, the four last cases being done as a preliminary measure in carcinoma of the rectum before resection.

Operations on Thyroid Gland—32 cases.

Ligation of the superior thyroid vessels was done in thirty-two cases, double ligation in all but three of them was done at the same sitting.

It was found that a preliminary hypodermic of morphia was of great value in allaying the nervous apprehension of the patient.

PLASTIC GYNÆCOLOGICAL OPERATIONS—35 cases.

These consisted of perineorrhaphies and plastic operations for the repair of the anterior vaginal wall. It is only within the last year or so that this form of anæsthesia was tried in our clinic in these cases, and results amply justified its use in the selected cases. The ease with which dissection of tissue planes is done, and the comparative hæmostasis commend its use. In those women, who, on account of age or because of bronchial conditions are unsuited for a general anæsthetic, its use is instrumental in bringing about a great deal of comfort otherwise unobtainable. The only disadvantage found was that during the cleansing of the operative field with tincture iodine considerable discomfort of a stinging burning character was complained of.

In perineorrhaphy the pudic nerve is blocked on either side by deep infiltration into the tissues containing its branches. For repair of cystocele an infiltration is made through the anterior vaginal mucosa into the fascial layers lying beneath, care being taken to direct the anæsthetic solution between these layers and not deep enough to enter the bladder. Plate 3 illustrates the technique.

SUPRA-PUBIC CYSTOTOMY—41 cases.

This procedure was done in forty-one cases, either for the removal of stone in the bladder, or as a preliminary measure to prostatectomy. Local anæsthesia is especially appreciated in old men with complete or almost complete obstruction. The operation is absolutely painless, and is by us always preferrably done by this form of anæsthesia.

PLATE III.

OPERATIONS ON TESTICLE AND CORD—33 cases.

This group includes hydrocele and other tumours of the testicle, epididymis, and cord.

RIB RESECTION—31 cases.

The advantage of local anæsthesia in rib resections for empyema is conceded by all, and should not in most cases be done any other way. Children as young as eighteen months have been operated upon for this condition by this method. There is no occasion for any pain whatever after the initial thrust of the needle.

TECHNIQUE FOR RIB RESECTION—

A series of intra-dermal wheals is made with an ordinary hypodermic needle along the line of the proposed incision. Through this area infiltration is made into the subcutaneous and muscular tissues down to the periosteum of the rib. To complete the anæsthesia, a long slender needle is used to block the corresponding intercostal nerve posterior to the proposed resection site as it lies under the protecting edge of the rib.

In the use of novocaine local anæsthesia the following conclusions were arrived at from a study of the foregoing cases:

ADVANTAGES

1. Less shock.
2. Operations are painless.
3. Absence of post-operative emesis.
4. Dissection facilitated.
5. Comparatively bloodless operative field.
6. Elimination of dangers of general anæsthesia, especially in associated heart and lung pathological conditions.
7. Elimination of fear of general anæsthesia on patient's part. In fact, it is frequently asked for by patient.
8. Patients are able to co-operate with surgeon both before and during operation, so that comfortable placing on the table is assured, and post-operative backache is avoided.
9. Nourishment may be taken immediately following operations, except in special cases, important in itself and also indirectly by the forestalling of post-operative acidosis from starving.

10. Ileus of bowel less frequent.
11. Healing of wounds not interfered with.
12. Cultivation of careful handling on the part of the surgeon.

DISADVANTAGES

1. In acute infections the infiltration is not desirable.
2. Nervous and apprehensive patients make poor subjects for its use, and should have a general anæsthetic.
3. Most children for similar reasons should have a general anæsthetic.
4. Discomfort of preparation of operative field where irritating antiseptic agents are used.

CHRONIC INFECTIONS OF THE NASAL ACCESSORY SINUSES WITH TOXIC ABSORPTION

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WHILE in recent years much has been written about infections of the accessory sinsues, I do not think that their importance is even yet recognized by the profession as a whole; as witness the large number of cases which are either neglected or wrongly treated. When we consider that these sinuses are in direct continuity with an organ peculiarly liable to traumatism and infection, we do not wonder at the frequency with which they are involved in nasal inflammation, and, likewise, when we study the position of these accessory sinuses (two of which are without gravity drainage, and the others often supplied with insufficient or easily obstructed exits), we see that they are ideal fields for focal absorption.

Sinus infections naturally fall into two main divisions. Those with manifest discharge, and those without. Those with discharge are comparatively easy to diagnose, and are now seldom overlooked; but the second class still presents many puzzling problems. To aid in their consideration, cases without discharge may be divided into fairly typical groups.

(a) Those with mechanical obstruction in the nose as the underlying cause. (b) Those in which bacterial infection seems to be the main feature. (c) Those in which there is a hyperplasia of the bone and mucous membrane linings.

The first group, with mechanical obstruction as the underlying cause, presents a very typical picture. Usually these cases have not gone on to actual focal absorption, but, as they are in the incipient stage, they may well be included in this paper. The patient complains of a full, stopped-up feeling in the head, frequently with frontal headache, which is worse in the mornings, or on taking cold. There is a history of numerous colds in the head, and of a chronic catarrhal discharge that persists between the colds. There is more or less difficulty in nasal breathing, especially on lying down at night. On examination the nose presents a deviation high up in the septum, often pressing against the middle turbinate on one or both sides; the membranes are hyperæmic and swollen; and one or more of the turbinates enlarged. There is either no discharge or only a slightly watery one. On shrinking the membranes with cocaine and applying suction, frequently a glairy mucoid or muco-purulent discharge may be seen coming down from under the middle turbinate. The patient feels immediate relief, and can breathe freely. With a high, thorough sub-mucous resection the relief becomes permanent; the membranes gradually assume a healthy aspect; the colds occur less frequently; and we have a very grateful patient.

The second group of cases, those in which bacterial infection seems to be the main feature, is marked by definitely toxic symptoms, elevations of temperature, increase in pulse rate, digestive disturbances, and general depression, with other symptoms common to toxic absorption from whatever source. Frequently there is some nasal obstruction, but not necessarily so. There may be nothing discernible at the outset; but persistent, repeated examinations, especially in the mornings, will usually be rewarded in time by the discovery of a transient discharge. Bacteriological examination often aids in the diagnosis, streptococcus hæmolyticus and staphylococcus aureus being the predominating organisms, in my experience.

The class of cases presenting symptoms caused by hyperplastic inflammation and pressure, is thoroughly discussed by Sluder in his book on "Headaches and Eye Disorders of Nasal Origin". He reports a very complete series of cases of hyperplastic sphenoiditis. In these cases the symptoms are usually due to involvement of the nerve trunks in close anatomical relation to the sphenoid; and we have "maxillary neuralgia," with pain in the teeth, eyes, and temple; or "vidian neuralgia," with pain referred to the ears, neck, shoulder and arm. Many cases of migraine have been traced to this source, and often the patient complains of headaches persisting over years.

The diagnosis here is difficult, and requires careful and persistent study. In the early stages, thick and adherent discharge may be seen at the outlet of the sphenoid; but frequently no discharge is discoverable; and in very many cases the outlets of the posterior ethmoidal cells and sphenoid are not to be seen by any method of inspection. We have, then, in the majority of cases to depend on the recognition of changes in the appearance of the mucous membrane, by interpreting its colour, thickness, translucency, and vascularity in relation to the normal. A typical hyperplastic picture shows some increase in redness, with more or less thickness of the membrane, and epithelium. The vascularity is increased, manifested by the presence of macroscopic vessels.

In this group the ophthalmologist and the rhinologist meet on common ground, as optic nerve disorders often arise secondarily to hyperplastic bone changes in the sphenoid region. Less frequently the oculo-motor is involved, giving rise to a dilated or sluggish pupil, with asthenopia, for which the ophthalmologist can assign no reason. Sluder says that hyperplastic sphenoiditis and ethmoiditis is a frequent lesion in childhood, and the history of many cases supports this view. Recently a boy of ten years came into my office with a complete right oculomotor paralysis, ptosis, a dilated pupil, and divergent strabismus. The trouble started with a severe cold in the head three weeks previously. Examination showed a profuse muco-purulent post-nasal discharge, with the naso-pharynx almost filled with adenoid growth, and the tonsils greatly hypertrophied. With the removal of the adenoids and tonsils, followed by suction applied to the nose, the symptoms rapidly improved, and at the end of ten weeks, had entirely disappeared except for a dilated, sluggish pupil, I regard it as highly probable that the nerve as it passed through the spenoid fissure was involved secondarily to a sphenoiditis. The frequency with which cases of phlyctenular conjunctivitis are associated with profuse mucopurulent nasal discharge, and the rapidity with which they clean up after the discharge is cured by the removal of adenoids, followed by suction, indicates a close connection with spheno-ethmoiditis in these cases.

Perhaps the best way of illustrating these classifications will be by presenting a few typical clinical pictures.

Case 1. Mrs. M., aged thirty-five, was first seen in January, 1919. She gave a history of nasal discharge resulting from an attack of la grippe two years previously, and of exacerbations with every cold in the head. She was extremely toxic with evening rises of temperature of 103°; pus pouring from the nose; and both ears infected. The acute symptoms subsided under irrigation, followed later by suction. *X*-rays showed a large, dull left frontal sinus. Nasal examination of March 17th revealed a profuse purulent discharge from the anterior ethmoidal region, with staphylococcus aureus as the infective organism. The septum was deviated to the left high up.

Complete recovery occurred in this case in six weeks following a high submucous resection with free opening of the frontal sinus.

Case 2. Mrs. S., aged forty-five, was first seen by me in March, 1919. Since 1909, when she contracted an acute nasal infection, she had been suffering from recurring seizures of pain and headaches; the pain being between and around the eyes and aggravated by change of position. There was a slight elevation of temperature with these attacks, accompanied usually by a serious discharge. The condition was several times pronounced hay fever. Two months previously an acute tonsilitis was followed by pain and throbbing in the left side of the face. The whole head felt dull and heavy.

The initial inspection showed no discharge, but on repeated examinations, after shrinking the mucous membrane with cocaine, a small amount of sero-purulent discharge was obtained by suction. This showed coccus hæmolyticus. *X*-rays revealed involvement of the left antrum and frontal sinus. In this case all pain and symptoms ceased in six weeks following intranasal opening of the antrum, frontal sinus irrigation, and the administration of an autogenous vaccine.

Case 3. Mrs. F., aged thirty-five, complained of headaches mainly in the left parietal region; and of diminution of vision in the left eye. For the past two months she had been suffering from frequent colds in the head, with persistent sneezing and a profuse watery discharge. There was also loss of weight and slight febrile reaction on exertion. One week ago she noticed that she could not read with the left eye.

Anterior rhinoscopy was negative, but posteriorly the left middle turbinate was seen to be reddened and thickened, as compared with the right; no discharge. The left pupil responded feebly to the direct test, readily to indirect; vision 20–200 left; 20–20 right. A large central scotoma in the left eye. Fundus entirely normal. Wassermann and urine negative. *X*-ray: clouding of the ethmoid cells on the left side.

Operation, February 20th, 1918. Radical intra-nasal ethmoid exenteration and opening of sphenoid. No pus found. March 2nd, 1918, vision 20–50, and central scotoma much reduced in size. March 25th, 1918, vision improved to 20–30, scotoma relative, and disc showing pallor on the temporal side. May 25th, 1919, vision 20–20, and J.I. There remained slight pallor of the temporal side of disc, but the fields were entirely normal.

In the study of chronic sinusitis, of course, other sources of toxic absorption must be considered. The teeth, tonsils and intestines, e.g., may give rise to toxicity, and obscure the picture.

In trying to formulate conclusions from a study of sinusitis with toxic manifestations, one has to emphasize local conditions, as all toxic diseases have symptoms in common. There are a number of characteristics which take prominence in these cases and may aid in diagnosis. In drawing the following conclusions I wish to acknowledge my indebtedness to Dr. J. A. Mackinity, with whom I was associated as house surgeon at the Manhattan hospital.

As in other branches of medicine, an accurate, detailed history is of prime importance. Usually if traced back to the first onset, the symptoms will be found to originate in an acute nasal or tonsillar infection.

Exacerbations and remissions are characteristic of the history of most of the cases, until they finally sink into a state of chronicity.

Pain in the head is usually present at some time during the trouble, and more often noted on the affected side. It may be frontal, parietal, or involve the neck and shoulders.

Headache as distinct from pain in the head is often a marked symptom. Many cases of migraine have been traced to chronic sinusitis.

Mental depression, irritability, and inability to concentrate are frequently present.

There is frequently a daily rise in the temperature to 100 or 101 degrees, and this is heightened by exercise.

The importance of a thorough study of the eye in these cases is not yet so fully appreciated as it should be. Frequently a carefully taken field will give the key to the situation, when all other diagnostic methods are indefinite. Markbreiter reports the study of the visual fields in one hundred cases of empyema, all cases in which the eye itself manifested any change which might cause visual field disturbance being excluded. Visual field changes were found in seventy of the hundred cases, although the fundus, in each cases was normal, and the vision perfect.

After a study of the literature of this subject, and of my own cases, I feel that we are merely on the threshold of the possibilities of this field. Most of the nerves supplying the head and face pass within a confined space in the sphenoid region. The interweaving connections between the different ganglia and systems are very complex and difficult to trace; but, as our knowledge of them and their pathology increases, many cases now set down as neurasthenias, neuralgias, and tics, will be found to be due to definite lesions. Let us hope that in the future we shall not be compelled to be content with such diagnosis but shall be able to trace each symptom to its source.

THE CAUSATION OF THE PSYCHONEUROSES

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I. The Definition of the Psychoneuroses

THE psychoneuroses, to be clearly understood, must be separated from the other great groups of nervous diseases, and this is easily accomplished, by viewing all the diseases of the nervous system from three standpoints, such a division being based, on the pathological condition.

There is in the first place a large group in which the pathological changes are definite to the eye in the post-mortem room, and in which the tissues are attacked as a whole, so that there is no selective action on the nerve cells, or fibres, but cells, fibres, connective and vascular stroma are together affected. To this group the name of gross organic disease is given, and its localized action described as encephalitis, in the case of the brain, as myelitis in the case of spinal cord, and as neuritis where the nerve is the structure diseased; while, where a more generalized condition is present, the inclusive diagnosis meningo-encephalo-myelo-neuritis is well applied.

In the second place, there are those diseases in which the nerve cell, or fibre, is selectively affected, by a toxic, or other primary cause, and from this large group a division into two sub classes must be made, namely, on the one hand, into a group, where the signs of permanent structural damage is definitely present, and which may aptly be termed the degenerative group, and on the other hand, into a group where the clinical evidence is in favour of some definite metabolic change in the cell, frequently of congenital origin, or produced by some cause which while altering the cell nutrition, yet allows recovery to occur.

No apt terminology has been given for this important division of nervous diseases, and with hesitation the suggestion is brought forward to term such disease in the brain as encephalocellosis, in the spinal cord as myelocellosis, and in the nerve as neurocellosis, with a nomenclature for the more generalized cases (comparable to the name given in the gross diseases) of encephalo myeloneurocelloses having as two sub classes the degenerative and non-degenerative.

Finally we have the third pathological class, that under discussion, "the psychoneuroses", which includes all those conditions in which there is no actual disturbance of the metabolism of the cell, but where the clinical signs are due to faulty physiological action, pure and simple, and with removal of the cause which must be a physiological one, a return to normal conditions should occur.

This classification on a pathological basis may be appended as follows:

1. The encephalo myelo neurites.
2. The encephalo myelo neurocelloses.
    (a) Non degenerative.
    (b) Degenerative.
3. The psychoneuroses.

It must be added, that no fine distinguishing line can separate any division as all of these classes merge gradually from one into the other.

In considering the classification of nervous diseases, there is an old error, that has for centuries been a stumbling block to a proper and intelligent study of the whole subject, and which must be absolutely allowed to disappear from scientific works, and this error is the use of the terms nervous and mental. All the diseases of the mind are physical, there is no room for a separation into nervous and mental, and psychosis should be applied to every condition whether mild in degree, as in a psychoneurosis or more severe, as where metabolism is affected.

The fact, that individuals vary from one another, and that the same cause brings out different functional characteristics, or weaknesses, which also will vary in degree, is a fundamental condition that must be remembered.

The confusion brought about by these two terms is especially noticeable in these gross organic diseases, where the mental faculties are affected, since here such a case is stated to be a nervous case at one moment and a mental at another.

With the abolition of these two divisions, the relationship of normal individuals, congenitally below normal, and finally the dementia præcox classes, becomes clearly defined and the parallel nature of the clinical signs of these types, becomes valuable in the study of the physiological activity of the brain.

II. Normal Physiological Action in the Nervous System

In order to understand both the causes and the physiological disturbances in the psychoneuroses, it is necessary to have a working method of approaching the subject, and this implies a clear recognition of what a normal individual is, and how such a normal person manages his nervous system.

All the physiological disturbances which characterize the psychoneuroses are properties of the healthy person, but they are only present to a degree commensurate with normal action, and compatible with ordinary daily life.

They vary greatly in their degree of intensity in each of us, and form the characteristics which make us individually different. Even the advanced changes, which are found in the more serious congenital nervous cases, may at times be noticed in daily life. For instance the negativism of the dementia præcox is characteristic of the untrained child, and has its by part in the foolish obstinacy of many adults.

The burden of nervous inheritance is so widely distributed, that to examine any person carefully, implies to find in him a tendency to abnormal development in some physiological direction which if it were allowed to increase would determine him to be a psychoneurotic, of a mild or even advanced degree.

The boundary between normal and abnormal is not fixed, one passes over gradually the border line, and it is perhaps best to decide the limitations of the normal, by giving the limits of the abnormal, and to lay down the rule, that the psychoneurotic patient is one who has so marked physiological disturbance that he cannot or can only with difficulty lead the life of a normal individual, and only then for a brief period.

The second question namely, as to how a normal individual manages his nervous system, is composed of two separate considerations; on the one hand arises the important issue as to what are the sources of the material which nervous activity is to function upon, and on the other hand, the mechanism of the action.

(*a*) The sources of stimuli, largely arise in the world outside of us either from affective sensory processes, or more frequently in the thoughts that are conveyed to us from other individuals. These psychic contents from individual to individual are of the greatest importance, for while they may form but a basis to add to our general information, and be stored in memory, yet on the contrary they may be composed of material that will be of the greatest importance to our lives and may be associated with great emotion. Similarly, the simpler sensations, optical, auditory or general, may produce serious disturbance in the psychical or somatic centres.

Another source of our activities comes from our memories, and here again the character of the supply will be very varied, and the selection we make, will have a great influence on the physical condition.

The final source comes from our body energies, and largely from the visceral organs by the sympathetic. Normally the greater number of these sensations does not enter the threshold of psychical sensation, and it is only under certain abnormal physiological conditions, that we become hyperconscious of a greater inflow of these stimuli.

II. By the mechanism of nervous activity we mean a condition in which the nerve cell or functionally associated groups of cells are vital living individuals and in continuing this paper the discussion will be limited to those cortical cells engaged in psychical action, and which are therefore defined as those vital living cells engaged in psychical activity.

This psychical activity exhibits itself in three main directions, it is able in the first place to concentrate on a definite stimulus presented to it, in the next place to associate this stimulus with other which are stored up in memory, and in the third place, it is capable of inhibiting extraneous stimuli that are of no value to the subject.

These three predominant qualities of psychical activity must be understood and followed, if one is to understand the development of the psychoneuroses.

We use these properties of psychical activity, in all the different functions of our mind. In our perceptions we must concentrate, associate and inhibit, to produce dependable memory, or to awake past memories we again concentrate, associate and inhibit; while in the motor processes of our mind, in judgment and volition, we must again concentrate, associate and finally inhibit.

It is the defect in this great vital activity that is the ground work of the production of the psychoneuroses.

Another important normal activity must now be laid stress on, is that while there are individuals who can keep two or more mental processes equally active at the same time, yet with most of us, it is only possible to keep one mental process clearly in focus, but there is frequently a second, or even a third, that is being used, but less clearly. For instance we eat, walk, run, and perform other functions at the same time as we talk; or we may keep a subordinate thought in the sub-psychical realm, while we are more actively interested on another theme.

People vary in this regard, and there are those who are very marked sub-psychicals, and who even with the inhibition of the highest psychical activity, still continue to perform normal processes sub-psychically.

Take one case as an example that is of interest, where a lady at six one Sunday morning became sub-psychical, and dressed, went to church, returned home, ate her breakfast, telephoned her friend and at 11 o'clock became active psychically again and was unconscious of all that she had done in that time. Below the subpsychical realm there are also many other centres, whose independence is comparatively great as compared with higher sub-psychical centres, over which the highest centre possesses the power of increasing action by concentration and of preventing action by inhibition (the power of active association being lessened or absent as the lower centres are reached).

Again, it must be realized, that we have the ability to change the psychical activity from the subject that at first was of greater interest, and to focus the mind on an activity that was formerly sub-psychical, or was from the visceral group, and the new focus of thought becomes the active one, and the former active process becomes of lowered psychical value.

The lower centres are constantly receiving stimuli of a reflex nature, and the action of these stimuli produce their result without our being aware of their occurrence.

In the sub-psychical areas the same is true, and affective stimuli may enter this field and be responded to without our realizing their presence, this being a characteristic of many individuals, and even the highest psychical processes may be so affected by outside stimuli and the person may not actively concentrate, associate and inhibit them. Such a condition is the highest form of reflexicity in a nervous system, and as it explains the different degrees of suggestibility. and becomes of great importance in individuals where the psychical activities are not well developed or educated.

III. The Causes of the Psychoneuroses

Before discussing the actual exciting causes, it is necessary to refer to the two great basal predisposing influences that underly so many psychical disorders.

In the first place there is education, which includes all those influences that a child is brought under, both at home and at school, which tend to form the character of the adult. The importance of education is, therefore, almost of incalculable value, and the greatest care must be taken to examine the influence it may have had, in producing the patient's symptoms.

The second condition to which we are all subject and from the effect of which we cannot escape is that called instinct. Instinct is always active in all our sub-psychical thought, and at times it is the source that determines the course of action which we pursue.

The strong man controls his instincts, but when his health, be it mental or physical, shows impairment, then the basic instinct may take control, and decide his action.

Discussion over the value of this quality is important, and must be left over, as this paper deals, more with the active and acute causes rather than the basic conditions.

The first and greatest group of the active causes may aptly be termed the neurogenetic, since it includes all those conditions which are the result of over-exercise, or of mal functioning of the varied nerve centres.

Under this class, there are three separate groups, namely, the psychogenetic, where the cause is due entirely to psychical action, and it may be added that this is by far the most important group, in the next place we have the reflexogenetic, where continued stimuli produce by their action a change in normal stability; and finally that class of cases where a visceral organ, by reason of its own excessive activity, leads to disturbance in the general function of the nervous system.

THE PSYCHOGENETIC CAUSES OF THE PSYCHONEUROSES

Following the line of thought presented under the study of the normal individual in regard to the source of stimuli, and the psychical activities normally exercised in using them, the following may be taken, to represent the most common causes, in the production of the psychoneuroses:

I. Sudden psychical shock such as may be produced by the news of the death of a relative, or the actual visual presentation of equally acute conditions, are as important to the individual as if one had been struck on the head by a club. Curiously there is at times no emotional factor present as there has not been time for that to occur, although its presence is often a relief to the strain.

These sudden shocks are the most typical form of external stimuli causing physiological changes.

II. The next most frequent cause represents a combination of both external and internal agents and it is relatively common.

Overmental work may be due to prolonged exposure to thought stimuli, which are transferred actively through the mental processes to a motor outflow, as for instance in the work of stenographers and telephone operators who frequently break down from sheer overstrain, but it is interesting to compare the steady mental effort of the professor, or the business man, or the lawyer, whose constant application, year after year, which in the absence of even any emotional factor, will produce a psychoneuroses, noting that the source of the mental food will in many of these cases originate as much or even more from the memory processes as from external impressions.

III. Perhaps the next cause will appeal to more of you than the last two.

The home associations are largely associated with external stimuli as a source, but show also an internal origin, when we consider, how frequently these associations are recalled during the day.

The business girl returns home, the actual house is perhaps dull, the surroundings mean and sordid, the conversation of the other inhabitants annoying, or the food distasteful, and this going on from day to day becomes an irritant.

Much more frequently it is the individuals themselves at home that cause the overstrain, the father may drink and this arouses all the pride that the girl may feel to prevent her friends realizing the fact; again there is over and over again a definite lack of sympathy, or a true mental dissimiliarity in tastes and ideas between the mother and son or daughter, perhaps the mother is depressed or irritating, or too fixed in her ideas of control, and as a result the home life is full of bickering. This condition applies well to ill assorted marriages and to badly arranged parternships in business, and to clerical relationships where the views of parson and congregation do not fit well together. One must lay stress on the point that these are external stimuli but that their great effect is due to the fact that they are retained in sub-psychical thought, and frequently recalled to active consciousness as the individual wishes, or is forced to do so by active association.

The rôle of the physician is a very difficult one here, in settling the muddles of life and one must realize that the emotional content may vary according to the type of case, and all grades accompany the condition from annoyance to hatred, and this subconscious emotion is very serious in its effects.

IV. An entirely different causative factor is to be found in the fact that many workers go home at night to a solitary room, have few if any friends, and may not occupy their brain in any definite way.

As a result they develop the habit of introspection, which means that they become hyperconscious of their own thoughts, or in other cases of their own somatic and visceral realm. Naturally one must remember that this introspective tendency is congenital in many cases, and also it is one of the fruits of all conditions that lead to the psychoses, but in the case outlined it may itself be the cause of the disturbances, and it must be classed as a type where a neuropsychosis is produced by faulty direction of the psychical activities. The absence of the healthy stimuli set up by normal conversation with other people, and the monotony of examining our own sources of thought, and especially when a paucity of memories or a sensation of loneliness is present, intensify the acuteness of this important cause.

V. A peculiar basis for the psychoneuroses which is seldom referred to, and which follows well after solitude, is the reading of other people's thoughts in books. I have been struck by the number of cases of people who have been injured while in an introspective condition, who have developed a psychoneuroses from reading books on literature and particularly those on Christian science, as also the varied sexual literature that haunts civilization. Unable to understand what they read, and evolving wrong psychical conclusions with the effort of trying to digest literature above their ken, has resulted in the production of very trying forms of nervous disturbance. You read a book above your intelligence and your brain as one is accustomed to say becomes addled, and that is the development of psychical strain.

VI. The next cause which comes to our attention is based on the following disturbance and may be called "unsatisfied wishes". Some desired objective presents itself to the mind, very frequently the desire to obtain some important wish, which will vary with the individual and his age. To the child it may be a gift that has been withheld, to the student an examination which appears the greatest objective in his life, to the older girl the desire for attention or a husband, and to the woman a child, while her husband may equally have a similar wish.

The business man longing for wealth, or the politician for success, while as age advances the wish to be gratified may lie in the success of the children at school or in life.

VII. Another cause of psychogenetic disorders is similiar to the last and it is dependent on the failure to attain the object desired, the failure in the pursuits, that have been deified. These failures are usually far more intense in their reactions than the former class as there is frequently associated with them a great deal of emotion and the particular type is that varying from disappointment, to depression and to despair, and which if allowed to continue may produce a metabolic change and an advanced psychical condition follow. On the contrary with the unfulfilled wish the emotional side cannot be often depression, as the final attainment is in doubt, but there is rather either a sense of anxiety or a more serious emotion varying from annoyance to anger, which will cause a greater degree of physiological change.

VIII. Contrary in its emotional content is the feeling, that comes with the satisfactory attainment of desire, or with undue success. and even here the individual may be lifted above a level basis in his mental condition, and have a psychoneurosis produced.

IX. The division is one of the greatest importance and has been given by some unwisely as a separate psychoneurosis while it is only a cause.

A long period nursing a sick child or relative, or a long unsettled business venture or simpler affairs of life as the care of a family, or the strain of work during college, with the question of final result, all these and thousands of other like conditions are very likely to produce a psychoneurosis and it must be remembered that the emotional association is that called anxiety which grades into another far greater emotion, namely, that of definite fear. Fear is characteristic of all those conditions in which the psychical activity is unable to bring the questions that enter consciousness to a clear and definite conclusion.

Fear is a by-product of nearly all psychoneuroses, for as the nervous stability of the individual becomes upset by ungratified wishes, by failure in attainment, by sudden shock, by joy and by anxiety the condition of the mental activity is such that the person becomes inquisitive and often deeply introspective of the question, What is the matter with me? Am I going insane? and finding no answer to his queries the fear element increases and there is established a vicious circle, in which morbid thoughts flourish.

To these varied causes of the psychoneuroses one must now bring forward a very important difference and that is this. In some such as these due from great shock or definite overwork, the cause may be immediately apparent, but from time to time there develops a very important result, namely, that the actual cause becomes forgotten, or is purposely sunk and inhibited in psychical activities, and the person still suffering from the psychical neuroses is absolutely unaware of the true cause. On the other hand it must be acknowledged that while apparently the person is not conscious of the cause yet in truth they may realize what it is, and either wilfully or unconsciously withhold it from their physician, particularly where the wish or anxiety is based on a subject that they personally do not wish to disclose.

The Reflexogenetic Causes of the Psychoneuroses

This type of cause is easily understood, as it is a matter of daily experience, that acute pain will produce a generally increased nervous condition, even a severe toothache causing a neurotic condition that may last some days. At the time of the menstrual period it is customary to see many forms of psychoneurotic disturbances that are caused by the pain of a dysmennorrhœa. On the other hand, we are prone to neglect the fact that there are cases where the pain is only discomfort, but which has persisted for a long period, and that this is equally possible as a cause of the nervousness, naturally one must take great care in deciding that the discomfort is not part of the nervous condition but is primary in the organ itself.

Instances of this are common, as for instance chronic indigestion causing the patient prolonged annoyance, will gradually bring about a general nervous condition, but it must be distinguished from those cases where the sympathetic is itself abnormally active or inactive, and the distress is due to the resulting failure from this cause and not due to primary gastric disease since the treatment must be absolutely different.

Another very common and neglected cause is a chronic pain in the back due to mild arthritis, often associated with septic teeth and which may be accompanied by slight nerve root symptoms, and the annoyance of this condition which has produced the whole psychoneuroses has been disregarded by the physician who has been completely occupied with the neurosis and considered the cause as a symptom of the general condition.

The third great neurogenetic cause is the viscerogenetic class, where pure overaction of the visceral organ leads to direct nervous disturbance and not by reflex means alone.

Excess gastric and intestinal action may prove to be a source of exhaustion by itself, prolonged over action of the heart not only causes nervous disturbance through the consciousness of the person but through the sympathetic exhaustion. Perhaps the most definite type of this class is the sexual type where, while one must recollect that increased hyper-irritability or exhaustion may be primarily psychogenetic, where the individual allows his thoughts to rest too much on this sexual line of thought, or may be reflex where masturbation is a principal cause, yet there is a true exhaustion brought on by actual over frequent masturbation or by too frequent sexual intercourse with a resultant sympathetic exhaustion which in its turn saps the strength of the whole nervous system. This is truly a type of overaction primarily in the visceral region with its secondary effect on the nervous system.

This then concludes the three groups of the psychogenetic causes and before proceeding further the question arises: Does neurogenetic disturbance produce the more advanced condition of a metabolic change. There can be no definite line drawn between the psychoneuroses and the cell changed diseases, the encephalocelloses, because one passes into the other, and there is no doubt in my mind but that long continued worry or excess stimulation can produce a typical metabolic condition, but I believe that in these cases another factor comes into play that must be considered as the prime cause, namely that of inheritance.

The fact that there is a certain type of individual whom we term as normal, and that we must accept under this heading people who vary a great deal in their normality, and that these classes pass into the groups where these abnormalities are so marked and so definite, that while we still look on them, as normal mentally, yet their physiological idiosyncrasies are so definite and their reaction to psychogenetic and other stimuli so easily produced; and, above all, recognizing the fact that the nervousness has occurred early in life, and is associated with a family trend of marked degree, renders the placing of all these congenital cases in the class of non-degenerative encephalo celloses.

But again remember that there is no distinguishing line between these metabolic neuroses and the psychoneuroses proper, and that the physiological effects of worry in the congenital cases are the same as in normal people, but appear more easily, advance to a greater degree, and enable us to pass on to those more severe types the dementia præcoxes.

Besides these two great classes the neurogenetic and congenital many other causes may produce perhaps a definite psychoneurosis such as toxæmias and infections, but theoretically at any rate such causes must primarily affect metabolism, and it is best to discuss them entirely under this class of cause.

Under vasculogenetic causes, arise many conditions which produce gross organic disease, as under such types as thrombosis and hæmorrhage; and also many forms of metabolic change, as for instance where there is disturbed nutrition where arteriosclerosis is the root condition; but one must also add to this long summary of the causes of the psychoneuroses the fact that temporary vascular spasm may produce functional disturbance, which, however, if long continued will lead to graver organic disease.

In concluding this paper on the causes of the psychoneuroses it is necessary to urge the physician in treating these conditions that he must make the greatest effort to ascertain the cause as until this is found there is not a great probability of successful treatment.

APPENDICITIS—HIGH MORTALITY IN PERFORATED CASES

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APPENDICITIS is a disease which, if early relieved by operation, runs a comparatively short course, is practically never fatal, and is attended with few, if any, after effects. And yet hospital statistics especially in these later years of standardization and improved clinical records, show that appendicitis is the surgical disease, par excellence, which most often exceeds its normal period of hospital detention, and that it has a death rate quite out of proportion to the seriousness of the initial symptoms.

An exhaustive study of two hundred and sixteen cases of appendicitis operated upon in "L" Service at the Montreal General Hospital, during the two years ending June 30, 1920, shows conclusively that the unfavourable results are to be attributed directly to delayed surgical intervention.

In the tabulation of the clinical histories and results of treatment of these cases there were four points which stood out with special distinctness:

1. Of the acute cases 44 per cent. were perforated.
2. Wound infection developed in 95 per cent. of the perforated cases, but in only one per cent. of the non-perforated cases.
3. The perforated cases were in hospital more than twice as long as the non-perforated cases.
4. There were no deaths in the non-perforated cases but 16·9 per cent of the perforated cases died.

If we admit, as we must that perforation is an avoidable complication of appendicitis, these figures constitute a very serious indictment against the medical profession.

There are, of course certain factors which render delay in procuring surgical aid almost inevitable. In remote rural districts, for example, a doctor is not always immediately available; then frequently, especially if the symptoms do not seem alarming, there is hesitancy on the part of the family to accept the doctor's recommendation of removal to hospital on account of the expense which they do not wish to incur unless it is absolutely necessary; and lastly, train service may be limited to twenty-four hour intervals.

There are, however, other factors which make for delay, which can and should be eliminated. It is, for instance a common practice to prescribe a purgative for a patient who complains over the telephone of abdominal pain —a prescription for abdominal pain which should never be ordered before a careful physical examination has been made. The exhibition of morphine, also, in the treatment of appendicitis is responsible for a large percentage of the fatalities In the series above referred to, several cases had received morphine for from one to six days before admission, and there was one fatal case which had been kept under morphine for fourteen days before admission Then too, while the general practitioner usually diagnoses the case correctly he frequently fails to assess accurately the significance of the physical signs and symptoms and the general trend of the disease. It is unfortunate that many practitioners do not think that a case is running an unfavourable course unless the temperature is high, a palpable mass is present, or vomiting supervenes. The fact that the pulse rate amounts from 70 to 80 to 90 on succeeding days goes unheeded, and consultation is postponed until the symptoms become alarming. The result frequently is perforation.

While the results of operation in perforated cases are much better than they were twenty or even ten years ago, the fact remains that perforation is attended with grave risk to life, prolongs suffering and disability, and is frequently the cause of post-operative sequelæ such as ventral hernia, painful adhesions and intestinal obstruction, which later necessitate further surgical intervention.

It can not be that this hospital is unique in having to deal with so many cases of appendicitis with perforation It must be a continental-wide experience, and therefore of more than local interest. The remedy lies through the joint action of the members of such a constituted body as the Canadian Medical Association. The difficulties of individual propaganda are obvious. If it were only recognized, both by the laity and the profession, that there is no curative medical treatment for appendicitis, the death rate and the number of post-operative infections would be reduced to the irreducible minimum, and a serious load would be lifted from the already overweighted public services. We are very hopeful that a Special Committee of the Canadian Medical Association may be named to invite the co-operation of the provincial medical associations in gathering statistics upon this subject, with a view to inaugurating a propaganda which shall have as its goal the acceptance by the public and the medical practitioner of Sir William Osler's dictum: "In appendicitis a surgeon is never called too soon—frequently too late."

THE FUTURE FUNCTION OF MODERN MEDICINE

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APPLIED medicine as we conceive it to-day, is an all-inclusive term, covering every form of therapeutics, medical and surgical. It has to do then with every form of adjustment of the sick body to its surroundings, and with every form of adjustment of the surroundings to the sick body. Therefore it is in brief the hygiene and the sanitation of the sick—dealing with those special physiological and environmental conditions which produce pain or damage and which we, therefore, call disease. Applied medicine is peculiarly individualistic because it deals with the individual peculiarities of the physiology and the individual peculiarities of the environment of the particular individual who is in trouble. There is no way in which applied medicine can be applied wholesale. The individualistic practitioner of medicine is an essential which can never be done away with so long as individual persons become individually sick.

Public health, on the other hand, deals primarily with the hygiene and the sanitation of the well; that is of those whose physiology and whose environment are of a fairly uniform and ordinary pattern—and because of this uniformity, public health as distinguished from applied medicine can be carried out on more or less wholesale lines. Thus both public health and applied medicine are fundamentally hygiene and sanitation, but they constitute two ends of a scale—corresponding to all degrees of physical condition from the highest health to death. The connecting links are preventive medicine and epidemiology, those two branches of medicine of which the first, preventive medicine, is a special technical branch of hygiene and deals with medical and surgical measures directed to furnishing the body with new protective mechanisms like vaccination, removal of tonsils, etc., which are preventive of threatened disease rather than curative of disease already existing; the second of which, epidemiology, is a special technical branch of sanitation and deals with the removal from the surroundings of the environmental causes of disease themselves.

There is no real break in the series from public health to medicine. Convenience and custom, tradition, the demands of human nature for relief from existing evils, have developed the disease-treating end of the scale to the highest point, it is true, but, carefully considered, public health through preventive medicine and epidemiology, fuses with therapeutics by almost imperceptible gradations. Yet there is a fundamental distinction after all; sociological, however, rather than medical. That distinction is this medicine proper deals with the patient, primarily, for his own good; public health deals with the patient, primarily, for the good of others. For instance, medicine cares equally for the typhoid case and for the diabetes case to preserve the particular individuals from dissolution. Public health cares for the typhoid case to prevent the injury of others; it pays no attention to the diabetes case, for the diabetes case cannot hurt others.

Such at least is our present conception. But while the diabetes case cannot hurt others in a direct biological sense since the specific disease, diabetes, is not transmissible, he does hurt others in a sociological sense, through the expense, diversion of energy, sorrow, etc., which his disability involves. Not only are his own services lost to his family and community, but to a greater or less extent the services of those who must care for and attend him are diverted from productive activities. No more striking illustration of this injury to the community produced by non-infectious disease can be offered than is involved in the military maxim—it is better to wound an enemy soldier than to kill him; for an enemy killed reduces the enemy forces only by one; but an enemy wounded reduces the enemy forces by two, three or four—that is, by the wounded man himself and also by those companions detached to care for him. Medical and nursing work applied to the sick person are unproductive in the economic sense, in the same sense that the medical service in the army is not a fighting unit. Only such measures as actually promote health and increase efficiency can be regarded as positive productive activities, like making shoes or growing vegetables. The physician and the nurse are repair people, not manufacturers. But it is a curious thing to note that those who have to do with patch work, repair, the correction of evils, are those who constitute the learned professions; while the productive occupations are classified as trades. Thus theology deals largely with the injuries, defects and disabilities produced by sin; the law, with criminals; the army and navy, with human attackers and invaders; medicine, like the army and navy, with attackers and invaders, but other than humans—the minuter forms of life. We most of us look upon heaven as that ideal state in which there will be no doctors (or lawyers or soldiers or ministers, either), because there will be no need for patching up anything—production, not repair, will be the only activity.

If now we turn from the mere mechanics of the situation to the great principles behind the activities of medicine, we find, it seems to me, an evolution in the medical attitude towards disease, a change in the way of looking at things which curiously parallels similar evolutionary changes in other lines. This change is that which perhaps may be summarized, if it is not taken too literally, in the phrase, which recommends us to love our enemies rather than hate them. This doctrine is applicable even to medicine, where our great enemy has been disease. To my mind, modern scientific medicine, in contrast to all the pathies and sects of the past, consists essentially in the conception that instead of fighting disease we should co-operate with it. What else do we do in preparing and using our vaccines and antitoxins than this? We do not fight the germ; rather we discover what it wants and accede to its demands; thus satisfying it and at the same time ourselves escaping its attacks. In many other ways we now co-operate with disease instead of fighting it. We give our fever patients water as much as they wish—recognizing that their condition demands it, and acceding to that demand. This is quite contrary to the older practice of denying water to the fever patient—based on the principle that everything the fever required must be forbidden to it. If the fever patient wanted water, that fact alone proved that water was bad for him. This principle has been almost universal. If a child was hungry it was regarded, in the old days, as almost a physiological criminal—if a mental patient behaved obstreperously, we beat him and chained him up! It is not long since a teacher's only remedy for the stupid child was thrashing him regularly. Now we have changed our methods in all these directions. We secure the co-operation in treatment not only of the patient, but of the disease itself. This is because we have a saner view of medicine and disease. We see that what we labelled as disease and thought of as a wholly abnormal process, conducted against the laws of nature in contravention of all right, is not abnormal, wrong, to be suppressed in every way and in all its manifestations, but a serious, logical and physiological, if often amateur and incoordinate, attempt on the part of the body forces to meet unusual physical, chemical, or biological conditions. Our duty is to help the body in its efforts to meet these conditions, or to remove the need for meeting them. We no longer say that if the patient is constipated, produce diarrhœa; if he has diarrhœa, produce constipation; if his heart is running fast, slow it; if it is running slow, hasten it. That truly allopathic form of blind blundering has gone out for a generation and we are now quite as much insulted by those who still obsoletely call us allopaths as by those who call us by any other term which is a relic of bygone darkness. Science is the knowledge of nature; applied science is cooperation with nature—and modern medicine is co-operation with nature in that field which we call disease.

I should like to apply these modern principles which we all accept as commonplaces in our own medical technicalities, to our sociological relations with the rest of human beings. We sometimes have considered our profession itself as a sort of sociological patient, suffering from various pains and aches within itself from some of its own defective or degenerate members; and subject also to attacks from outside invaders, in various guises. Too often we have applied to these "diseases" of our own profession the very principles of blind symptomatic treatment which, in our technical medicine, we have abandoned. Confronted with changes in conditions that have resulted in pain to us, we have given ourselves the morphine of neglecting and ignoring the situation; if the public situation has demanded of us a revision of our procedures in relation to the public, we have not enquired the reasons why such revisions were demanded, but have merely by force tried to maintain our sociological activities at the point which tradition taught us ought to be the normal. In fact we have, I think, too often committed the cardinal physiological crime of any organ in a body—that of failing to correlate our activities with those of the rest of the body, real or politic. The whole public, blindly suffering for the most part, finds itself so situated that the methods of practice of medicine suitable enough under old conditions require changes to correspond with modern life. To refuse to meet the needs of changed conditions would be as unreasonable as it would be to force the ordinary diet upon a diabetic, with the idea of correcting his diseased condition by stubbornly refusing to acknowledge the reasonableness of the demands of his body for a change suitable to his changed metabolism. Our modern principles of medicine demand that we shall study that diabetic in every detail and suit our treatment to his body, not force his body to comply with our conception of what is normal. Just so with the problems that confront us as a body politic. One man in about one hundred and sixty of the male adult population is a physician —we should not merely "hit a head wherever we see it" amongst the other one hundred and fifty-nine, if they propose some change in medical relations, however distressing such changes may at first appear. The heart might as well say to the pneumonic lung: "I don't care why you want me to change my gait—I don't care what the emergency may be that forces you to ask of me some service I am not used to giving—I will keep on just as I am—or quit."

Rather let us discover why the public want this change or that; why medical service of the old type is so obviously unsatisfactory; why chiropractors and others fill some sort of human want. If the public is getting a real service, we ought to find out why our own profession, which knows, like science itself, no limitations in its fields, should remain ignorant or inept on those points.

Very specifically I would ask that the Ontario Medical Association should most earnestly support and take part in this study of the pains and aches of the medical body; and should pursue its investigations with the idea of relieving the causes, not of merely jumping on and stamping out the symptoms.

All this applies to every form of problem that confronts the medical profession to-day, from Prenatal Clinics to Workmen's Compensation, and if the profession does not intelligently study and intelligently act, nothing but disaster can ensue.

Dr. Billing's recent paper in the *Journal of the American Medical Association*, hits the nail squarely on the head. If the medical profession is to exist at all other than as slaves to other bodies, it must do so by taking its own destinies in hand itself—and its own destinies lie now, as always, in its service to the race. If I may be still more specific and direct, let me cite as one minor instance the Life Extension Service recently advertised in Canada. Is there the slightest reason in the world except apathy and lack of foresight, why every practitioner fit to make an insurance examination should not establish a Life Extension Service of his own? If this is for any reason not practicable in given cases, then why cannot a few medical men or a local society act to establish these services? They must be good services, honestly conducted, with conscientious work and the best skill, but these details we may assume. If the people want periodic examinations, and there can be no doubt as to the immense benefit to the race of such examinations, they are going to have them, somehow, sooner or later. If the profession, as a profession, does not act, some other body, public or private, will.

We are in a transitional stage of medicine. But we always have been and always will be. The medical man who looks back to the good old days of steady going practice or forward to the good new days of steady going practice, is a man doomed forever to disappointment. All life is transitional, always developing and changing. We recognize this in our medicine; in our medical and surgical practice; he who does not recognize it in such fields is already down and out professionally. He may not himself realize this, but all his associates do. Let us recognize the same thing sociologically—and let us meet the sociological changes with the same keen alertness that we give to our internal relationships—turning, as Kipling says, "Keen, untroubled eyes back to the instant need of things." We are doing our medical duty by the individual; the serious new sociological question is—are we doing our medical duty by the race?

The United States Army data showed 75 per cent. of men of draft age diseased or defective. School surveys show school children from 40 to 90 per cent. defective, while malnutrition affects 30 per cent. Persons of thirty to thirty-five, examined thoroughly at unexpected times, showed about 60 per cent. with defects serious enough for medical attention; unsuspected, by 93 per cent. to 96 per cent. of the sufferers. In Boston, 24 per cent. of dispensary patients had been sick three months or more before medical service reached them. In six surveys of wage earners, 30 per cent. of the seriously sick were found unattended medically. In rural districts the figure reached 53 per cent.

With such a situation, medicine as it is to-day is NOT covering the needs of the people. It is up to the medicine of to-day to do it.

CANADIAN MEDICAL ASSOCIATION MEETING, HALIFAX, JULY 5th-8th, 1921

TWO RARE ABNORMALITIES OCCURRING IN THE SAME SUBJECT —PARTIAL ABSENCE OF THE CORPUS CALLOSUM— THE STOMACH SITUATED ENTIRELY WITHIN THE THORAX

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and

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THESE striking and very rare anomalies were discovered in a girl, fifteen years of age, who was sent to a county home in Nova Scotia, with the following brief clinical note: "Idiot from birth; never developed mentally from childhood; fairly well developed physically. Conversation shows a childish type of mind. Answers questions in monosyllables, followed by a childish grin. Dirty habits."

We are indebted to Dr. J. W. T. Patton, who had charge of the case when in the home, for the short clinical history given below. He reported that "she was always a heavy eater, *e.g.*, for breakfast she would eat a large bowl of porridge and milk, with several slices of bread (all she could get), and several (pint) mugs of tea, if given her. The other meals were in proportion. She never showed any dyspnœa. Menstruation occurred every two or three months, and was very profuse, simulating a hæmorrhage and lasting a week. She was in good health until three weeks before her death She complained first of headache, then of pain in the abdomen, which became greatly distended with gas. At first, there was diarrhœa, later, constipation. The temperature was variable reaching at times 103°. She appeared to be improving, but died suddenly while being bathed." In regard to her mentality, Dr. Patton states in a later communication that she could neither read nor write, nor form words. Unlike children of her age she did not enter into conversation with other persons, but her remarks were chiefly restricted to answering "yes" or "no" to questions asked her. She had a doll which she sang to—chiefly rag-time songs, which she had picked up, and familiar hymns, but the hymns were all mixed up, and she never sang a hymn through. She would talk a little when a conversation was begun by some one else. She had little reasoning power, and was quite excitable, laughing and calling at the boys playing on the lawn. She was impulsive, rather than lethargic; not quarrelsome, timid, and afraid of the water and of strangers.

The body was sent to the Medical School of Dalhousie University for dissection, and was noted to be well developed and adequately nourished for that of a girl fifteen years of age. The external genitalia were well formed, both sets of labia being prominent, while there was a vigorous crop of pubic-hair. The first abnormality was discovered by the dissectors of the abdomen, who reported that they could find no trace of the stomach. Exploration disclosed the fact that the duodenum, when traced upwards, disappeared into the thorax through what ought to have been the œsophageal opening of the diaphragm.

Upon opening the thorax the stomach was seen forcibly doubled upon itself, lying within a peritoneal sac situated between the heart and the inner surface of the right lung, and of course between the pericardial sac and the mediastinal pleura This sac displaced the heart slightly to the left, and also gave rise to a deep permanent indentation on the inner aspect of the right lung below and behind its root, giving that organ, which chanced to be splendidly fixed by the formalin of the preservative, an extraordinary appearance. One could have thought, with

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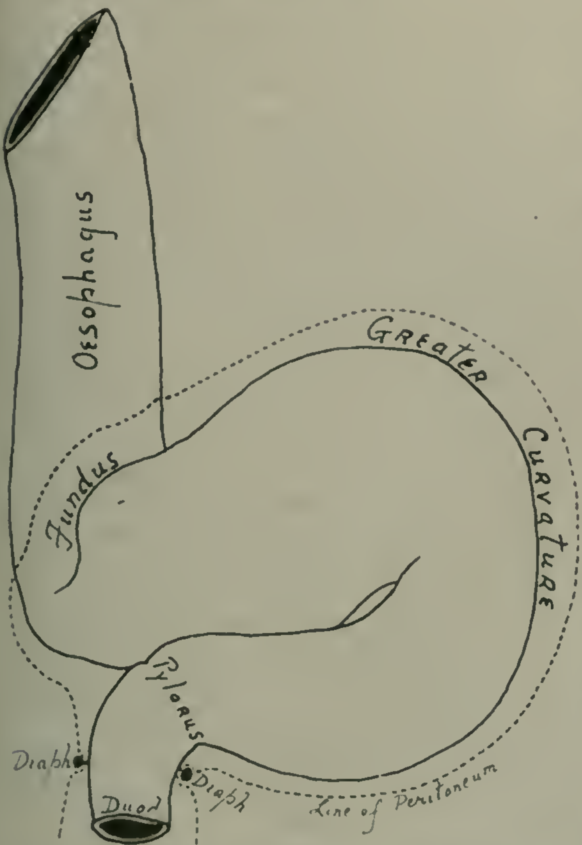
From the Editorial Board of Nova Scotia.

such reduction in the cubic space allotted to the right lung, that the individual would have evinced some embarrassment particularly after a heavy meal, but Dr. Patton was able to assure us that there was never any history of dyspnœa. This all goes to show how readily the respiratory apparatus can adapt itself to an abnormal condition of this kind.



Outline sketch of the stomach and of the lower end of the œsophagus, viewed from the right side. Note that the greater curvature is directed forwards and that the fundus is to the right of the lower end of the œsophagus. Three-fourths normal size.

The peritoneal sac that enclosed the stomach was attached around the lower end of the œsophagus in the position of the dotted line indicated in the figure. Its attachment below was to the margin of the opening in the diaphragm, through which the elongated duodenum entered the abdomen. The muscular coats of the stomach were strongly developed and had become contracted owing to the effects of the formalin in the injecting material, so that there was no possibility of estimating the normal capacity of the viscus It was doubled upon itself in the most marked degree the œsophageal and pyloric orifices being in close apposition with each other. This disposition of the organ served to mark it off into two constituent portions (body and pyloric portion), these being further demarcated by a slight constriction in the region of the sharp bend. The greater curvature was directed for the most part forwards, while the fundus was indicated by a small cap-like bulging immediately to the right of the œsophageal aperture, at which point there was a very marked twist the latter no doubt having acted as a slight obstruction to the passage of the contents owing to its marked character. The position of the pyloric sphincter was fairly well defined.

The great omentum was very scantily developed, and practically devoid of adipose tissue. It was attached as usual to the greater curvature, and descended upon the right side of the viscus. Its lower margin hung downwards like a curtain around the duodenum, as it passed through the diaphragm, and projected into the abdomen to the extent of an inch. It is interesting to note that the fusion which normally takes place between the great omentum and the mesentery of the transverse colon during embryonic life, had been prevented in this case.

The gastro-splenic omentum was likewise feebly developed, and was attached as usual to the fundus of the stomach. It had perforce to pass through the diaphragmatic opening alongside the duodenum, in order to reach the spleen, which was normal in position.

The gastro-hepatic omentum was attached to the narrow cleft that represented the lesser curvature of the stomach, and was most scantily shown. Its abdominal portion, however, was attached to the duodenum and passed from that to the transverse fissure of the liver. The portal vein hepatic artery, and common bile duct, occupied their usual positions in the right free border of this omentum.

The upper end of the œsophagus was normal in appearance, but the portion situated in the posterior mediastinum was thin-walled, and dilated to about double its normal calibre, thus corroborating the previous conclusion that an obstruction had existed at its junction with the stomach. A significant fact was that the œsophagus was so short that its lower end only reached to a point 1·6 inches above the œsophageal opening of the diaphragm, suggesting that it had never occupied this aperture. It is therefore evident that the shortness of the œsophagus may have exercised an important influence in the production of this extremely anomalous position of the stomach.

The first and second portions of the duodenum were of necessity much longer than normal, the distance from the pylorus to the opening of the common bile duct being 4·6 inches, instead of the usual 3 inches. The relation of the pancreas to the duodenum was practically undisturbed, and this viscus was normal in position.

The blood vessels to and from the stomach had of course to pass through the diaphragmatic opening in order to reach the thorax. This opening was thus rather tightly packed by the duodenum, these blood vessels and the three omenta. The duodenum, however, did not appear to be constricted in any way.

When one comes to consider the causation of this condition, several facts of developmental interest at once present themselves. It became evident at an early stage of the investigation that we were not dealing with a case of ordinary diaphragmatic hernia, seeing that the shortness of the œsophagus had apparently prevented its lower end from ever reaching the abdominal cavity. It therefore became manifest that we were confronted with a case where the stomach by some means or other had become located in the thorax within a persistent recessus pneumato-entericus. The latter, it may be explained is a diverticulum from the lesser peritoneal sac which extends upwards into the thorax in the early embryo, but normally becomes obliterated during the later developmental stages. We have been unable to obtain statistics bearing upon this remarkable condition. It is certainly the first of the kind we have encountered, and we feel that it must be a very rare one indeed, and there ore well worthy of being placed on record.

The position taken by the stomach was rather remarkable, for, as the figure shows the greater curvature was directed forwards while the feebly developed fundus was to the *right* of the lower end of the œsophagus. In order to appreicate more fully what had exactly happened here, it should be explained that in the early embryonic condition the greater curvature of the stomach looks directly backwards At a later stage it swings over to the left while the lesser curvature or anterior border of the embryonic stomach gets swung over to the right, as a natural sequel. It is obvious that the stomach had swung in the opposite direction in this case, and in fact to an extreme degree, thus bringing the greater curvature directly in front. This would of course explain the pronounced twist at the junction of the œsophagus with the stomach.

The Brain. Upon opening the dura mater it was noted that the falx cerebri existed only at its anterior and posterior ends. It was of normal width at its point of attachment to the crista galli, while its posterior end was merely one inch and a half wide. The portion connecting the two ends was, however, reduced to the proportions of a faint ridge. The reason for this condition was at once manifest upon removal of the brain, for it was observed that the arachnoid bridged across the longitudinal fissure throughout almost its whole extent giving one at first the impression that the mesial surfaces of the hemispheres were fused together. In order to study effectively the condition of matters we decided to make a series of cross sections of the brain. Upon studying these it was noted that the anterior end of the corpus callosum immediately behind the genu was of normal thickness (·35 of an inch). About half an inch behind this point however, it faded away as a definite structure and was replaced by a lamina of grey matter at the bottom of the longitudinal fissure supported underneath by a thin layer of white matter and ependyma. As we proceeded backwards with the coronal sections the cavities of the lateral ventricles became larger and larger, while the posterior horns expanded into cavities of considerable size (each 1·65 inches in height and 1·6 inches in width) and communicated freely with one another across the middle line. We therefore found evidences of the hydrocephalic condition which is usually associated with deficiency of the corpus callosum. It is a strange fact, however, that this distension should have affected mainly the posterior horns of the ventricles. The results of this distension were manifested by a compression and distortion of the longitudinal fissure, the lower end of which was definitely deflected to the right, and by three marked projections of the convolutions on the mesial surfaces of the hemispheres into the roof of this large cavity. The body of the fornix could be distinguished only at its anterior end. Its anterior pillars which were normally developed, could be traced as usual to the corpora mammillaria The posterior pillars, however, had become compressed upwards so markedly, that they had become merged into the roof of the large dilated cavity mentioned previously, and consequently could not be traced by the naked eye into the descending horns. The septum lucidum and fifth ventricle were both absent. These it may be mentioned, are remarkable concomitant phenomena in cases of absence of the corpus callosum. The basal ganglia were well developed.

The most striking feature to be noted in reference to the fissures of the brain was the division of the fissures of Rolando into upper and lower segments, thus demonstrating a persistence of the embryonic form of this sulcus, which is developed normally in two portions, the latter becoming joined together during the later developmental stages. This division of the Ro'andic fissure into two segments, it may be noted, is a common feature in cases of deficiency of the corpus callosum. The shorter upper segment cut the mesial border of the hemisphere very deeply on both sides, and much farther back than usual. It extended outwards 1·3 inches on the right side, and 1·2 inches on the left side, and was limited externally by a well developed gyrus. The longer lower segment, when traced upwards on the right side bifurcated to enclose the upper segment, while on the left side it swept upwards behind the upper segment, and very nearly reached the mesial border of the hemisphere The fissures immediately in front and behind the Rolandic sulcus were naturally much disturbed and distorted on both sides and the motor areas appeared to be poorly developed for the age of fifteen. The position of the angular gyrus could not be accurately defined. The parieto-occipital fissure, like the Rolandic, was placed much farther back than usual, being within one inch of the occipital pole; the result of this being that the occipital lobes of the hemispheres were much reduced in area The weight of the brain (after hardening) was 1030 grammes. Spironema pallidum was stained for, but with negative result.

A somewhat rapid survey of the literature relating to partial or complete absence of the corpus callosum shows that only about sixty cases have been reported up to the present time. The condition, therefore, is decidedly rare. The analytical study of the clinical features of this remarkable condition is peculiarly difficult. Where clinical histories are available they are usually lacking in those directions where we would desire precise information The following points however, seem to be established The majority of the patients died in infancy or early childhood. Few reached the twenties; one or two are stated to have been o'd. The majority, again, are noted as being backward at school, mentally deficient, or actually idiotic Occasionally, physical development has been retarded as well.

Left-sided spastic hemiplegia and generalized spastic paralysis are rather frequent clinical manifestations Epileptiform seizures either Jacksonian or generalized, have not infrequently been observed. Headache was complained of occasionally. In one case rapid enlargement of the head was noted. In regard to the very essential feature of apraxia we, unfortunately, have no information. The detection of disorders of co-ordination would, of course, be exceptionally difficult in the case of persons of weak intellect. It is worthy of special note that only two cases in the series were attended with no noticeable bodily or mental infirmity.

On consulting works on clinical medicine, even special works dealing with the nervous system, one is struck with the paucity of the information given in regard to the corpus callosum. This is, possibly, due to the fact that, as yet there is no unanimity as to the function of this structure, and pathological changes affecting it are comparatively infrequent. Tumours of the corpus are occasionally met with, but are undiagnosable with any certainty, for any clinical signs due to interruption of the communication between the two hemispheres by way of the callosal fibres are speedily masked by the more general features of brain tumour.

There is clear evidence that total absence of the corpus callosum can exist without any alterations in the physical and mental attributes sufficient to mark the individual as noticeably different from others who are entirely normal. In this connection we may cite the statement of Kaufmann (*Archiv f. Psych.* xviii) tha complete interruption of the callosal fibres, resulting from embolism and softening, has produced no symptoms This would seem to support the opinion expressed by Dana ("Diseases of the Nervous System", 4th ed. p. 373) that the centres of each hemisphere for receiving visual impressions are almost independent and the centres for the memories, which are still more highly specialized are practically independent. We infer that the higher mental functions, therefore, work either in one hemisphere or in the other, that the two halves of the brain do not co-operate with each other in much of the higher intellectual work."

We may contrast this view with that of Bastian ("The Brain as an Organ of Mind" p. 485) who writes "that the more specialized emotional, intellectual and volitional regions in each hemisphere wherever they may be, and however they may be related to one another, are necessarily by means of the association system' of fibres, brought into intimate communion with their corresponding sensoria regions of various kinds. It is in this way, therefore, that the higher functional regions of the two hemispheres may be brought into relation with one another through the medium of the fibres of the corpus callosum." So far as anatomical evidence goes, as one of us has shown in a former communication (*Can. Med. Assoc. Jour.*, July, 1917) Bastian's contention would seem to be supported.

A little reflection will show, we think, that these apparently opposed views are not really mutually exclusive. On the principle that in every organ there is an overplus of tissue beyond the amount requisite for the adequate performance of function, may it not be that structures of one hemisphere alone are all that are necessary for the ordinary motor sensory and intellectual needs of the individual. Such meagre evidence as we possess seems to indicate that the callosal fibres are of more importance in maintaining and governing the finer co-ordinations of muscular movement in the limbs of the opposite sides than in regulating the higher function of mentality. Thus, apraxia of the homolateral hand has been shown to occur when there is an interruption of impulses which pass from the left cortex through the corpus callosum to the right cortex. Such a lesion may be in the left hemisphere or in the corpus itself. A study of the recorded cases of absence, partial or total, of the corpus callosum will show that where there have been serious mental defects there have been other gross anomalies of development of the brain, such as microcephaly, an embryonic type of the convolutions and their related gyri, or hydrocephalus interna. Some of these, such as porencephaly and hydrocephalus, are sufficient to account for the spastic paraplegia and epileptiform seizures which have been reported in these cases.

The association of congenital anomalies of the brain with others occurring elsewhere is a subject of some interest. In the recorded cases of defect of the corpus callosum two associated developmental anomalies are recorded; in heterotopia of brain substance and cryptorchidism. The stomach condition in our case, so far as we are aware is unique. It is not, as one might think at first sight, a case of true diaphragmatic hernia, but a much more unusual thing than even that rare condition, viz., a high position of the viscus. Some few of the developmental anomalies that occur in arhinencephaly, or example, such as absence of the nose and olfactory bulbs, cyclopia, are evidently related, being due to deficient vegetative force in the superior growing-point. Others, such as hare-lip, cleft palate, malformation of the heart and great vessels, umbilical hernia, polydactylism, and defects of the diaphragm, are not, of course, explicable on such grounds. With respect to other anomalies of the brain it has been noted that in cases of hypoplasia, particularly of the fore part of the organ, anomalies of the adrenals sometimes occur. Crypt orchidism, reported in one case of absence of the corpus callosum, is common enough apart from any cerebral anomaly.

It may possibly be that disturbances of innervation, such as would result from such grave cerebral defects might exert a restraining influence upon the course of growth of other parts, but this is not in accord with a view, very generally held, that growth and function are to some extent mutually exclusive, function being largely in abeyance in an actively developing organ. It is hard to understand immature and imperfect nerve centres exercising any controlling influence over growth and development. It seems to be more reasonable to conclude that the occurrence of multiple anomalies of development in one individual are largely the result of chance, though a likely chance. Where one developmental anomaly is detected the odds are decidedly in favour of there being more than one. This seems to be supported by experience. As an instance we may refer to an autopsy recently performed by one of us upon the body of a child in whom there were no less than four congenital peculiarities; crypt-orchidism, megacolon, hypoplasia of the kidneys, and multiple cysts of the kidneys.

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SOME RESULTS OF PROTECTIVE INOCULATION AGAINST EPIDEMIC INFLUENZA

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A CONSIDERABLE amount of protective vaccination against epidemic influenza has been carried out in this country; so far there has been no published statement concerning its success. The observations described below are not extensive; they constitute what controlled observations have been made from the use of a rather large amount of vaccine prepared in this laboratory.

During the first days of the first epidemic, October 1st, 1918, in Kingston, sputum or swabs from the naso-pharynx of a number of cases of influenza were examined bacteriologically with results similar to many that have recently been reported, namely, that B. influenzæ, pneumococci, green producing streptococci and M. catarrhalis were found.*

These four species were immediately used in the preparation of a mixed vaccine. The method of preparation was very similar to methods which have recently been published. From the several strains of the four species obtained ten strains each of B. influenzae and pneumococci and five strains each of streptococci and M. catarrhalis were selected and grown in pure cultures on the same media which was used in their isolation. This consisted of meat extract, peptone, agar, adjusted to P.H. 7·2, autoclaved, cooled to 85°, enriched by the addition of 2 per cent. whole rabbit's blood and plated at once. Plates were heavily seeded with a large platinum spreader and incubated twenty-four hours at 37°. The growth was then washed from the surface of the agar with physiological salt solution, using a suction apparatus, and collected in 500 c.c. flasks in the form of a concentrated emulsion, twenty to fifty times stronger than the final vaccine. These flasks of bacterial emulsion were then heated to 60° for half an hour and test cultures were incubated for twenty-four hours. The several strains of the four species were then combined and diluted as follows (with the addition of one-half per cent. phenol):

B. influenzæ, 300 million bacteria per c.c.
Pneumococci, 100 million bacteria per c.c.
Green producing streptococci, 150 million bacteria per c.c.
M. catarrhalis, 50 million bacteria per c.c.

It will be seen that this vaccine contained a larger percentage of B. influenzæ than the vaccine recommended by the British War Office Conference[2], and most of that used in the United States[1]. The majority of those described contained equal numbers of streptococci, pneumococci and B. influenzæ; some contained still fewer B. influenzæ. Rosenow, 1919[3].

In the cases reported the vaccine was used in two or three doses, as indicated, the first of 0·5 c.c. or 250 million, the second and third of 1 c.c. or 500 million organisms each, at forty-eight-hour intervals.

In most cases there was a mild local reaction following inoculation, frequently accompanied by headache and lassitude. In a very few cases there was a marked systemic reaction, some temperature, lack of muscle tone, increased blood pressure, distinctly suggesting convalescent influenza.

Table I.—Results from the Inoculation of Queen's Medical Students with Mixed Influenza Vaccine

	Number	Per cent.
Men in group not inoculated......	51	..
Cases of influenza among men *not* inoculated, period October 1st to November 30th, 1918......	22	45·3
Cases of influenza among men *not* inoculated, period December 1st, 1918 to January 31st, 1919	2	6·9
Men in group given three inoculations..............	142	

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* Seventy typical cases of influenza examined bacteriologically during the first part of the epidemic, October, 1918, were found harboring the following organisms in the nasopharynx:

	Casso
Total number examined........................	70
Per cent. showing B. influenzæ...................	94
Per cent. showing Pneumococci..................	50
Per cent. showing Green producing Streptococci...	56
Per cent. showing M. catarrhalis.......	31

	No.	Per cent.
Cases of influenza among inoculated men, period October 1st to November 30th, 1918.........	17	12·
Cases of influenza among inoculated men, period December 1st, 1918 to January 31st, 1919....	10	8·

Table I indicates the results of the use of this mixed vaccine with a group of one hundred and ninety-three medical students. These inoculations were given before any cases developed among the number and before more than a half-dozen cases had developed in the city, so that there had been little or no previous contact with cases. From a few days after the inoculations to the end of the epidemic practically all of these men were in close contact with influenza cases, acting as physician's assistants, nurses or hospital orderlies.

Of the fifty men who were not inoculated, almost half of them developed the disease, the majority of them during the two months of active epidemic. Many of the cases were severe, including several cases of pneumonia.

The one hundred and forty inoculated men apparently enjoyed a considerable degree of immunity, 12 per cent. of them developing influenza during the two months of the epidemic.

Table II.—Results from the Inoculation of Part of the Military Personnel, M.D. No. 3, with Mixed Influenza Vaccine

	Number	Per cent.
Men *not* inoculated...............	4668	..
Cases of influenza among men *not* inoculated	1012	21·6
Men inoculated, two or three doses	907	..
Cases of inflenza among inoculated men........................	7	0·8

These statistics were collected by Major S. E. Thompson, formerly Sanitary Officer M.D. No. 3.

Table II summarizes the results with the military personnel of this military district (M. D. No. 3). At the time of the epidemic there were several, mostly small, units in the district, those inoculated were in Kingston, Ottawa, Cobourg and Deseronto. The inoculations were voluntary and were elected by about 18 per cent. of the officers and men in the several units. In most units the inoculations were given before any cases appeared, in others a few had developed before any inoculations could be given.

In the two months period, October 1st to November 30th, 21 per cent. of the uninoculated developed influenza; a much lower percentage than in the previous group, probably as a result of less intimate contact with cases of the disease. Slightly less than 1 per cent. of the nine hundred and seven inoculated men developed influenza, indicating again a high degree of protection during the short epidemic period.

Table III contains the results of inoculation of about half of a group of three hundred and twenty-eight lumbermen divided among seven camps near Paisley, Ont. Approximately half the men in each camp were inoculated and half not inoculated. Previous to and after the inoculations both groups were under similar conditions. At the time the inoculations were given several cases were well under way, so that the inoculated men had been exposed and for a short period resisted infection.

During the period, October 15th, when the inoculations were given, to November 30th, 29 per cent. of the uninoculated developed influenza and a little less than 3 per cent. of the inoculated developed the disease. Even after these figures are discounted by the small number of cases which had developed before the inoculations were given there is, apparently, evidence of a large measure of protection from the use of the vaccine.

At the end of the epidemic, November 30th, a questionnaire was sent to all physicians in Eastern Ontario who were supplied with the vaccine prepared in this laboratory. Some thirty have replied with as definite reports as could well be expected under such circumstances. These reports are summarized in Table IV.

Of the twenty-two hundred inoculated persons from various districts, reported in Table IV, slightly less than 6 per cent. developed influenza. Twenty-eight of the thirty physicians sending reports state that according to their observations the cases among the inoculated were less severe than among the uninoculated. There were but two cases of pneumonia and no deaths reported in the inoculated group.

These results are inconclusive in that we have little knowledge of the percentage of cases in the general population of the various districts or how long some of these inoculated persons had resisted infection before the vaccine was used.

In addition to the data contained in the tables, many physicians have sent reports which correspond in general with those previously stated in showing that persons inoculated enjoyed a certain degree of immunity and that where inoculated persons later developed influenza it less frequently advanced to pneumonia.

TABLE III.—RESULTS FROM THE INOCULATION OF PART OF A GROUP OF LUMBERMEN IN CAMP NEAR PAISLEY, ONT

	Main Office	Mill 3	Bruce Mill	Camp 3	Camp 5	Camp 6	Pine Camp	Total
Number of men *not* Inoculated	0	30	15	10	65	55	0	175
Number of cases influenza among men *not* Inoculated	0	10	2	5	15	15	0	47
Number of deaths among men *not* Inoculated	0	0	2	3	2	0	0	7
Per cent. of men *not* Inoculated who developed influenza	0	33	13	50	23	27	0	29
Number of men Inoculated	20	25	0	53	10	15	40	153
Number of cases among Inoculated men	0	0	0	3	0	0	1	4
Number of deaths among Inoculated men	0	0	0	1	0	0	0	1
Percentage of inoculated who developed influenza	0	0	0	5·6	0	0	2·5	2·6

Dr. James Kaliel gave these inoculations and kindly supplied the data contained in the table.

TABLE IV.—RESULTS FROM THE USE OF INFLUENZA VACCINE COMPILED FROM REPLIES TO QUESTION BY THIRTY PHYSICIANS IN EASTERN ONTARIO

	Number	Per Cent
Persons inoculated	2194	..
Cases of influenza among persons who received three or two inoculations	104	4·7
Cases among persons who received only one inoculation	24	..
Total cases among persons who received one or more inoculations	128	5·8
Estimated number of cases of influenza among the general population of the several areas	5 to 50 per cent.	

The apparent favourable degree of protection indicated by these results is probably in part to be credited to the fact that the inoculations were given during the first few days of the epidemic and the results stated are simply for the short period of the one epidemic wave, the only one in this district.

In the first group, Table I, where the observation was continued for a second two months' period a very significant difference is to be noted. In this group during the two months' epidemic period, as previously stated, among the not inoculated there was a 45·3 per cent. attack rate and among the inoculated a 12 per cent. attack rate. During the succeeding two months, however, there was a 6·9 per cent. attack rate among the not inoculated and an 8 per cent. attack rate among the inoculated. It would appear therefore that these one hundred and forty-two men enjoyed a considerable degree of immunity during a period not exceeding two months, but that beyond that period they were quite as susceptible to influenza as non-inoculated.

CONCLUSIONS

1. In several groups of persons where part were inoculated with a mixed vaccine, B. influenzæ predominating, there was a 22 per cent. influenza attack rate among the not inoculated and a 3·2 per cent. attack rate among inoculated persons.

2. The vaccine used in these inoculations will not afford protection for a period longer than two months.

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THE TREATMENT OF ANÆMIA BY DRUGS

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In every case of anæmia it is our duty to try to find the underlying cause in order, if possible, to remove it. Very often this can be done and thus the condition can be treated radically. But in many instances the cause is obscure or irremovable, and then all that the practitioner can hope to do is to repair or to lessen its ravages upon the blood. Thus the treatment of anæmia is either specific or symptomatic.

These notes are limited to the treatment of the condition by drugs, but this is often the least important part of the therapy. The removal of the cause, the regulation of the diet and whole manner of living, the obtaining of a free supply of fresh air and sunlight, are all essential, and none of us would think much of the hypothetical physician who, when asked to treat a case of anæmia, would merely write a prescription for Blaud's pills and then collect his fee with the full self-assurance that he had done all that was necessary for his patient.

Drugs may be used both specifically and symptomatically in the treatment of bloodlessness.

Examples of the specific use are the giving of thymol or of oil of chenopodium for the relief of hookworm disease. These drugs do not make blood, but they kill the hookworms that have been bleeding the patient, and when this drain is removed the patient's own tissues soon supply the want. Again, in the use of arsenic in pernicious anæmia it seems as if we were a tacking the unknown infection that is producing the disease. Otherwise how does the drug act? Pharmacologically, arsenic does not increase the red cells, but does tend to increase the white ones, and yet in pernicious anæmia the erythrocyte multiply under its use; also, in leukæmia the administration of the drug causes a diminution in the number of white cells instead of the increase which occurs in the normal body under its use.

We know that arsenic has a specific lethal effect upon certain plasmodia, and hence it is probable that in these diseases (pernicious anæmia and leukæmia) we have some infection of this nature. In syphilis and in malaria we see arsenic and mercury, and quinine respectively relieve the blood condition, not because they make blood, but because they attack the cause of the trouble.

Anæmia can frequently be successfully treated by the removal of a toxæmia which is the cause of it. Perhaps one of the best examples of this is alimentary toxæmia, where, owing to stasis and infection, the amino-acids derived from the digestion of proteins are changed into toxic amines which may act as blood destroyers. Here proper dieting and the use of laxatives, and possibly to some extent the employment of intestinal antiseptics, may change the whole aspect of the case.

In regard to the symptomatic treatment of anæmia it is evident that if one could only put good blood into the vessels in place of bad all would be well, and this is what transfusion of whole blood does. When an individual is suffering from severe anæmia produced by hæmorrhage, and is so low as a result that life is threatened, this appears to be the ideal method of treatment. He has too little blood in his body, and although his blood-forming tissues may be doing their best to restore this, in the meantime he suffers from the loss, and transfusion meets this temporary need. During the war many lives were undoubtedly saved by this emergency expedient.

But the life-history of the individual red blood corpuscle is very short—only ten days, according to C. H. Bunting—so that all the cells introduced by transfusion will be gone in that time (and very likely sooner after all that they have come through). Thus, in all except anæmia from hæmorrhage the effects of the procedure are likely to be only temporary, although the temporary relief may give the patients tissues the chance of gaining some ground in their struggle to restore the blood.

It must be remembered, also, that the transfusion of blood has many other effects beyond the mere adding of so many corpuscles to the recipient's circulation. Thus, it acts as a stimulant to the hæmopoietic system, it increases the coagulability of the blood, it adds to the bacteri-

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cidal or antitoxic properties of the blood and it improves the general nutrition.

In secondary anæmias where the colour-index is low, as each red corpuscle is insufficiently ladened with hæmoglobin, the drug that we most depend upon for the restoration of this iron-bearing compound is iron itself. The folk-lore in connection with iron is world-wide. The metal has always been recognized as perhaps the best of all spirit scarers. In India the bridegroom is armed with a sword of iron to keep away bad luck. Noise is much disliked by evil spirits and hence the value of the beating of iron tom-toms for the warding off of infection from villages. Church bells have a similar origin. But iron weapons are specially powerful, and when an Indian woman is confined these are laid across the doorway to prevent the entry of the spirits which may show themselves as puerpural fever and other complications of childbed.

Later, it was found that if pale people drank the water in which iron weapons had been placed until they rusted, they got better, so evidently the spirit of anæmia could be scared away by this method of attack, and such is probably the origin of the use of iron in conditions of bloodlessness.

Until the latter part of last century it was believed that iron therapeutically administered was absorbed by the alimentary tract, and then turned into hæmoglobin by the tissues. But Bunge suggested that this was not the way in which it acted. He believed that in chlorotic cases the anæmia was due to the fact that the iron of the food was acted upon by an excess of H_2S in the bowel, and thus turned into an insoluble sulphide which was lost in the fæces. When iron was given by the mouth it merely neutralized the excess of H_2S and thus preserved the food iron, which in consequence was absorbed. But it was soon found that the giving of bismuth and manganese, which would equally well neutralize the offending sulphides, did not relieve the anæmia, and, further, when iron was given hypodermically it acted equally well.

It is probable, that whatever be the form by which iron is given by the mouth, most of it is changed in the stomach into chlorides, and then into albuminates, and these pass into the duodenum where some are absorbed in solution, and others are precipitated as carbonates, and then are taken up by the epithelial cells and leucocytes, and thus reach the spleen and liver. Much of the iron, however, probably is not absorbed at all but passes on in the alimentary tract and is lost. That which is stored in the liver is changed into complex compounds which are doled out as required by the blood-forming tissues for the formation of hæmoglobin.

The whole body contains between 2.5 and 3.5 gms. of iron, and of this most exists in the form of hæmoglobin. If the amount be 3 gms. and one-tenth of the red blood cells are destroyed daily then the body will require .3 gm. of the metal each day to repair its loss. Now it has been shown by Stockman and others that food sufficient to preserve the iron equilibrium need only contain 5 to 10 mgs. or even less of this, and hence we must conclude that most of the iron set free by the daily destruction of red blood cells is either retained in the body and then again and again made use of, or if excreted into the bowel must be reabsorbed. The former is believed to be the chief way of its preservation. It is known that iron is absorbed only from the upper part of the small intestine and is excreted solely by the lower part of the large bowel.

An adult normal man possesses approximat ly five litres of blood and as he has about five millions of red cells per cubic mm. he must have in his circulation some 25,000,000,000 red cells. If one-tenth of these are destroyed every day, 2,500,000,000 will have to be produced each day in order to maintain his constant count. But in anæmia, as after a severe hæmorrhage, the production of red cells will necessarily have to be even more active than this, and hence more iron will be needed. It has been shown that a rabbit can produce 50,000,000,000 red cells in twenty-four hours in addition to those lost in the daily wear and tear. This increased production occurs through an extention of the red marrow, resulting from a differentiation of myeloblasts into erythroblasts, with the formation of new erythrogenic centres. This is noted in all anæmias except when the marrow reaction fails (aplastic anæmia).

Any factor which will check the formation of red cells will rapidly cause anæmia, just as much as an increased destruction of blood will do so. A man may be ruined either by the stopping of his income or by the overspending of it.

Whatever be the exact way in which iron acts, the great fact stands out that the giving of it tends to relieve those anæmias where the red blood cells are insufficiently charged with hæmoglobin, while, on the other hand, when these cells have individually sufficient hæmoglobin and the anæmia is due to a paucity of the red cells, then arsenic is the drug most likely to be of value.

Case Reports

SPONTANEOUS RUPTURE OF THE BLADDER IN PARTURITION

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Mrs. R., aged thirty-two years, delivered herself on September 3rd, 1920, of her fourth normal child by means of a dry labour lasting twenty-four hours, forceps not being employed. For the next thirty-six hours nothing abnormal was noticed by her attending physician but then, that is on September 5th, she commenced to have severe pain over the lower abdominal zone which remained constantly present and slowly increased in severity. At the onset of the pain she was given an enema which was slightly effectual but which did not relieve the pain in the slightest degree. A little later in the same day the patient was catherized and, according to her doctor, eight ounces of clear urine were obtained but this also did not give the slightest relief. Later more enemas were tried but none of them produced either stool or flatus, but according to her nurse she still continued to void urine normally. During this time her abdomen was becoming gradually distended and on September 7th, she, commenced to have attacks of vomiting. There had never been any fever but now the pulse became rapid and feeble so that during the night intravenous salines were given. On the morning of the eighth a catherization of the bladder produced only a very thick bloody fluid. The patient was then seen by me for the first time, that is on the afternoon of September 8th.

I found her in a state of collapse with one degree of fever and a pulse so weak and fast that it could not be counted accurately. She was complaining of extremely severe pain in the lower abdomen and was vomiting very frequently. The lower half of the abdomen was distended and rigid and only a very little bloody urine could be obtained by the catheter. There was not any œdema of the legs. The diagnosis to me appeared to rest between that of a septic peritonitis and that of an extra-peritoneal rupture of the bladder. As the uterus and lochia seemed normal and as the fever was very slight and had appeared only lately I felt that the former could be excluded almost certainly and this left a ruptured bladder as the only cause of the patient's symptoms. I therefore operated as soon as possible using ether anæsthesia and making a right rectus incision in the lower abdomen. As soon as the skin was opened the subcutaneous fat was found infiltrated by bloody fluid with an evident odor of urine. This made the diagnosis of ruptured bladder certain, so keeping below the peritoneum the wound was deepened and a large opening was found in the bladder. This was simply drained and from this time onward the patient made an uneventful recovery being discharged with a healed bladder on October 10th. At present the patient is completely well and free from all urinary disturbances.

The cases of spontaneous rupture of the bladder in parturition are so rare that I thought this one to be worthy of recording. The fact that normal urine was obtained two days after the birth had taken place makes one think that the bladder did not rupture at the time of birth but rather that during labour the bladder was injured by pressure to such an extent that a portion of its wall died and then gave away about two days later.

POST-MORTEM DELIVERY

Fergus J. O'Connor, M.D., C.M.

Obstetrical Clinic, Queen's University, Kingston

Case.—Mrs. B. Admitted to Kingston General Hospital by Dr. Campbell, August 31st, 1920. Eight and a half months' pregnant. Threatened eclampsia-albumenuria-anurea—high blood pressure 220+. For one week she seemed to be improving, then on September 8th, about 4 a.m. pulse bounded to 160 with restlessness, twitching, delirium, etc. Dr. Campbell was called. He called me at once and I just got to hospital as first convulsion came on. When I saw this case she was already in the convulsive seizure which terminated fatally in one and a half minutes. This was her only convulsion and so quickly and so unexpectedly had the end come that no preparation was ready for anything. Some minutes were spent in efforts to determine if life was really extinct. Cæsarian section was suggested but no attempt made to carry it out. Then fœtal movements being plainly visible and the question of the child's life being established, examination was made to determine possibility of delivery via naturales. There was no dilatation but the os was soft and easily dilatable, especially when drawn down and index fingers of both hands employed. I had some difficulty in rupturing the membranes, but once through these, easily secured both feet, performed version and rapid extraction was accomplished, the after-coming head presenting no difficulty. The cord was cut at once, the child was only slightly cyanotic and quickly responded to alternate splashings of hot and cold water. Actual time of manipulation six minutes; actual time from death of mother to birth of child ten minutes. The child was male, weighed five and three-quarter pounds, was oiled, wrapped in cotton wool, was placed on modified milk in two days, and was taken from hospital in excellent condition on the eighth day.

My main object in reporting the above case is to emphasize the possibility of a fœtus living for some time in utero after the death of the mother, even when that death is due to *organic disease*, and incidentally to point out that delivery in such cases via naturales is possible and even easy of accomplishment.

The literature quotes quite extensively cases delivered by Cæsarian section from mothers whose death was due to some accident befalling them while in the midst of otherwise perfect health. These I do not purpose discussing at all, because they stand in a class quite distinct and different from the case I have quoted.

The literature, however, is decidedly scanty and a bit contradictory in regard to the two outstanding features in my case: First, to the continuance of life of fœtus in the uterus of a woman dying from organic disease; and second, the method of delivery of such cases. Many able writers do not mention the subject at all. Others are fairly agreed that delivery should be attempted in all such cases, especially if past the sixth month. Only a few, however, quote personally conducted cases. *Hurst* says, "The child rarely survives the death of the mother more than a few minutes, and usually the death of both is synchronous." He later adds that with the persistence of fœtal heart sounds immediate extraction should be made by Cæsarian section, but better by forced dilatation. He says, "I had one experience in such a case which presented no difficulties and was completed in a few minutes."

Cazeaux and Tarnier say, "That diminished resistance after death has occasionally permitted the delivery of the fœtus to be effected by version or forceps. In fact this is preferable to Cæsarian section if the head is low in the excavation, for extraction through the incision would then be difficult." They cite cases from other authors, but none of their own.

Millot, an Italian obstetrician, gives rather a discouraging picture in his citation of fourteen cases attempted by the natural route and in which only three were delivered alive. His work was done between 1858 and 1878.

Parvin, of Philadelphia, gives the question considerable attention, quoting several authorities, some of them continental men of vast experience, and builds up a fairly strong argument favouring the advantages of the natural route with forced dilatation or incision of the os, version or forceps, etc.

Reynolds and Newell, of Boston, favour the same method and say that the physician is bound by every consideration to attempt to preserve the child's life by most rapid extraction. The question of the real death of the mother may be present and be sufficient to jeopardize the child's chances. If in doubt, they advise rapid manual dilatation, etc.

DeLee, of Chicago, whose scientific dealings with the subject makes his opinion worthy of note, says, "Since the dying mother takes oxygen from the fœtus, the death of the latter usually occurs first. If the mother dies suddenly the child may live a variable period." He quotes cases from other authorities, but the cases quoted were ones of accidental death and not organic disease.

I have presented my case. I have searched such records as were at my disposal. My conclusions, I believe, can be fairly well taken, namely: First, that the fœtus may continue to live in utero for some time after the death of a mother, dying from organic disease. My case was delivered ten minutes after the mother had died of her first eclamptic convulsion. Second, that the delivery of such cases is practicable by any obstetrician on account of the relaxation of the parts due to death and before the onset of rigour mortis. My case had not had a single pain, was only a little over eight months pregnant, with no dilatation and yet delivery was easily accomplished in about six minutes.

POST-GRADUATE EXTENSION COURSES IN ONTARIO

There has just been published by the Ontario Medical Association, the second schedule of post-graduate extension lecture courses for distribution to the local medical societies in the Province.

The subjects presented embrace the entire field of Medicine as existing to-day, and local groups of practitioners are to be congratulated on having at their disposal a plan whereby they may have brought to their own locality from time to time all that is new and up-to-date in their profession, presented by men well qualified to perform the task.

The success of the undertaking depends entirely upon the interest manifested by local groups and the extent to which the opportunities offered are accepted.

In several centres the plan has already been put into operation with very gratifying results. Every local society should show its appreciation of what has been arranged by making use of the services extended.

Editorial

THE ADMINISTRATION OF ARSPHENAMINE

IN view of the widespread publicity given to recent fatalities following the injection of an arsenical compound, the letter of Dr. J. W. McCullough which appeared in a recent issue of the Journal is most timely.

In this issue appears a retrospect which deals with the toxic reactions which occasionally follow the administration of the Ehrlich preparation and its allied products and their numerous substitutes.

Probably no drug has been so extensively used in recent years as arsphenamine and its allied compounds. As a result of the war, the countries at war with Germany, and in which Salvarsan had been previously patented by Ehrlich, granted a varying number of licenses for the manufacture of the drug. In Great Britain and the United States, the respective governments have formulated standards and established bureaus for the testing of the compounds issued for public sale. It is highly desirable that our Canadian authorities should establish a bureau, whose guarantee should accompany every preparation placed on sale in this country. Such a guarantee, while eminently necessary, does not relieve the physician using arsphenamine or neoarsphenamine, from a serious responsibility. There have been fatalities; though when one considers the inestimable value of the drugs, and the extensive use made of it, these fatalities should not be given undue weight.

Serious toxic reactions frequently follow the use of the drug, even when the best standards of chemical purity are complied with. For these, the physician who prepares the drug is largely, though not entirely, responsible. The drug is usually given by the intravenous route, one whose frequent use should not lead us to disregard its manifest hazards. It is most important therefore that the utmost precautions be taken, and that no carelessness or inexactitude be permitted in the chemical and surgical technique of such a procedure, even if the average dose of the drug administered possesses a large margin of safety.

The preliminary preparation of the patient for intravenous is of value, the dosage and the intervals between doses are to be considered, but the most important factor consists in the actual mixing of the drug and the technique of administration. This point is very fully dealt with in the retrospect previously referred to.

Much work remains to be done in chemical and pharmacological fields, with respect to arsphenamine, and its action in the human body. This applies equally in the clinical field. It is probably true that the average patient receives too little arsphenamine, and the ideal standard of treatment is still being sought for. Even with the invaluable Wassermann test, therapeutists are still groping in the dark, as to the total amount of arsphenamine to be given, and the proper intervals between treatments. In the beginning, and imbued with the glamour of Ehrlich's *therapia sterilisans magna*, syphilologists were satisfied with two injections of arsphenamine. With the occurrence of relapses, clinical and Wassermann, anti-syphilitic therapy has gradually been intensified and protracted, and as yet no sure resting point has been reached. One cannot, for many reasons, keep on giving weekly intravenous doses of arsphenamine, indefinitely. Our therapy must therefore include mercury, which while less treponemicidal than arsphenamine, and in adequate doses more toxic, is none the less a necessary adjuvant.

The administration of arsphenamine is open to one disadvantage. Its effects on the lesions of syphilis are so rapid and so striking, that the patient, and often the physician, are lulled into a sense of false security. It follows therefore, that the treatment is often inadequate. This inadequacy was exemplified during the war in the treatment of soldiers, when military exigencies demanded the return of the infected soldier to his unit at the earliest possible moment.

Two points should be stressed. First, if arsphenamine is to be given, its use should be safeguarded by all the refinements of chemical and surgical technique, and with a due regard for the dangers of its improper administration. Secondly, and no less important, the treatment should be continued for a sufficient period of time, to forestall all possibilities of a clinical or Wassermann relapse, and cessation of treatment should not take place till an adequate test of cure has been carried out.

A CHANCE FOR MENTALLY DEFECTIVE CHILDREN

THE Special Class, or as it is called in Ontario, the Auxiliary Class, is making its way in Canada. Halifax was one of the first cities to establish such classes. Victoria has had special classes for years and their success is a matter of interest and satisfaction to the community, who recognize the value and importance of the training given to these children, and the consideration and kindness with which they are treated. Vancouver has several teachers engaged in this work. Edmonton, Calgary, Regina, and Winnipeg have all made a beginning and every year the interest in this work grows and the work itself extends. In Ontario, a beginning has been made in Toronto, Ottawa, Hamilton, Brantford, Windsor and Guelph, but progress has not been rapid. A hopeful sign is the conference of Auxiliary Class teachers which was held in 1920 and in 1921 in connection with the Easter Annual meeting of the Ontario Educational Association at Toronto. The good attendance of Auxiliary Class teachers at these two conferences and their energy and enthusiasm as well as their excellent knowledge of Auxiliary Class work speak well for the future of the movement in Ontario.

In Montreal and elsewhere in Quebec, much interest is taken in the subject and with the valuable assistance of the Canadian National Committee on Mental Hygiene there as in other provinces, good work is being done.

To all those who are interested in the care and training of mentally defective Children, the best field of work is the National Schools. That is the place to discover the "Almosts", to find out and develop their gifts and to give them the best possible training and most suitable opportunities. In connection with our schools too, and especially with the medical inspection of schools, a beginning can be made of that confidential scheme of registration of the mentally-defective which must necessarily be the foundation of any system of adequate and kindly care and control for mentally defective persons,—a control which should protect the mentally defective person and provide for his independent maintenance as far as possible and for his happiness, but which should also protect society from the anti-social acts and tendencies of some mentally defective persons, and above all, should protect posterity from the curse of mental defect.

Correspondence

A NEW METHOD OF APPLYING DRUGS TO THE POSTERIOR URETHRA

To the Editor:

I wish to describe a method of instillating the posterior urethra which, I think, offers decided advantages over the procedure usually employed.

Instead of the Ultzman or Guyon syringe a posterior urethroscope, either a Swinbourne or Young, is used. The instrument is inserted, the part to be treated brought into view and swabbed clean. The medicament is then dropped into the lumen of the urethroscope, the position of which is such that the fluid will gravitate to the distal end, and the aperture fits so tightly that the drug comes in contact only with the visual field of the urethra. By gently revolving the urethroscope a few degrees to one side and then to the other the drug is brought to play over as large a urethral surface as desired. The fluid is then withdrawn from the urethroscope by means of a thin pipette or a small catheter and the instruments then removed. The advantages of this method are:

1st. The whole treatment is given under direct vision of the eye.

2nd. The drug is applied only to the surface desired, the remainder being protected from unnecessary exposure to the action of strong corrosive drugs.

3rd. By this method the patient can tolerate much stronger applications. For example, silver nitrate 25 per cent., without anything like the usual pain and urgency experienced after the present day method.

4th. The end results are very much better.

Very respectfully yours,
C. J. Gross, M.D.

Montreal, April 15th, 1921.

NUM PECCAVIMUS? "ACUTE ABDOMEN"

Dear Editor:

I saw in last number of our Journal,
(Is Journal proper word to use when it is not diurnal?)
That Mr. Cameron says our speech should be both pure and proper.
A shilling, can't be called a "bob". A hat is not a "topper".

Now Mr. Cameron doesn't like the words: "acute abdomen".
They "get his goat" to use a phrase not found in classic Roman.
I'm sure he'd much prefer to use the Anglo-Saxon belly,
No latin in that word is hid, forsooth! it rhymes with jelly.

Please Mr. Cameron! let us have a term that's more expressive,
Than the one that you take umbrage at and flay with words excessive.
Dear Virgil and old Euclid *et proh pudor!—lingua franca!*
Are hurled at him who said, "we sinned," *hinc lacryma illa sancta!*

'Tis said that words were used by Ben and by sweet Avon's Swan,
That in their day did not look good to all the scribbling spawn.
But now of course they're quite O.K., no longer are they slang,
O tempora! O mores! acute abdomen? bang!

M. D.

The Association

THE PROVISIONAL PROGRAMME OF THE FIFTY-SECOND ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION, HALIFAX, JULY 5th, 6th, 7th, 8th, 1921

GENERAL PROGRAMME

Monday, July 4th.

8.00 p.m.—Meeting of The Council, Halifax Hotel.

Tuesday, July 5th.

9.00 a.m.—Registration.
10.30 a.m.—General Business Session.
3.00 p.m.—Sections in Medicine and Surgery.
8.00 p.m.—Addresses of Welcome and two addresses in Public Health.

Wednesday, July 6th.

11.00 a.m.—Address in Medicine and three papers of general interest.
3.00 p.m.—Sections in Medicine and Surgery.

Thursday, July 7th.

11.00 a.m.—Address in Surgery and three papers of general interest.
3.00 p.m.—Sections in Medicine and Surgery.

Sessions of Public Health Section will be announced in final programme.

ADDRESSES

Address in Medicine. D. L. Richardson, Superintendent, Rhode Island Hospital, Providence, R.I. "The Relation of Infectious Hospitals to Medicine."

Address in Surgery. Hugh Cabot, Ann Arbour, Mich. To be announced.

SECTIONAL PROGRAMME

SURGICAL SECTION

E. W. Archibald, Montreal. "Notes upon recent cerebral work."

George E. Armstrong, Montreal. "Perforating Ulcer of the Stomach and Duodenum."

J. S. McEachern, Calgary. "Actinomycosis of the Abdomen; with Report of Cases."

James C. Masson, Mayo Clinic, Rochester. "Carcinoma of the Stomach."

A. E. Garrow, Montreal. "Difficulties in Diagnosis and Some End-Results following Operation for Cancer of the Breast."

A. J. Hamilton, Boston. "The End-Results of the Various Methods of Treatmen of Surgical Diseases of the Stomach and Duodenum."

W. S. Syme, Glasgow Royal Infirmary, Glasgow, Scotland. "Malignant Diseases of the Throat and some points in Diagnosis and Treatment."

Cornelium G. Coakley, Professor of Laryngology, College of Physicians and Surgeons, New York. "Hæmorrhage during and after Tonsillectomy; Surgical Principles and Methods for its Control."

D. H. Ballon, Montreal. "Tonsil Operations."

W. B. Howell, Montreal. "Some cases of unusual interest to the Anæsthetist."

W. R. MacAusland, Carney Hospital, Boston. "Ankylosis of the Elbow, with Treatment by Arthroplasty; with Illustrations."

Fulton Risden, Toronto. "Surgical Treatment of Deformities of Face and Palate, with Lantern Slides."

D. E. Mundell, Kingston. "End-Results of some War Injuries."

W. G. Turner, Montreal. "Arthritis of Acute Infectious Origin."

E. M. Eberts, Montreal. "Surgical Treatment of Goitre with Special Reference to Cases of Hyperthyroidism and the Application of Basal Metabolic Rate."

D. W. MacKenzie, Montreal. "Some factors in the Ætiology and Diagnosis of Infections in the Renal Pelvis and Tubules."

W. W. Chipman, Montreal. "The Septic Uterus and its Treatment."

H. A. Bruce, Toronto. "Hour Glass Stomach."

F. N. G. Starr, Toronto. "Results in the Surgical Treatment of Gall-Bladder Disease."

A. Primrose, Toronto. "Pancreatic Cysts."

W. Gordon M. Byers, Montreal. "The Eye as a Signal of Disease."

F. S. Patch, Montreal. (To be announced.)

MEDICAL SECTION

R. D. Rudolf, Toronto. "Rational Empiricism."

W. F. Hamilton, Montreal. "Some glimpses into Endocrinology."

I. M. Rabinovitch, Montreal. "Acidosis; Practical Application of its Study to Clinical Medicine and Surgery."

G. Gordon Campbell, Montreal. "Lantern Demonstration of some Skin Diseases."

A. T. Mathers, Winnipeg. "Psychiatry in Relation to General Medicine."

A. Birt, Halifax.—"Eye Symptoms in General Practice."

A. H. Gordon, Montreal. "Some Problems in Intracranial Diagnosis."

A. H. MacCordrick, Montreal. "The Diagnostic Value of Examination of Cerebro-Spinal Fluid."

A. A. Robertson, Montreal. "Encephalitis Lethargica."

R. H. Hardisty, Montreal. "Fractional Gastric Analysis."

G. W. Lougheed and L. M. Murray, Toronto. "Sub-acute Bacterial Endocarditis."

A. G. Nichols, Halifax. "Implantation of Secondary Cancer on the Endocardium of the Right Ventricle."

L. M. Murray, Toronto. "Observations on some of the Common Sounds heard in the vicinity of the Heart."

Wm. E. Preble, Massachusetts General Hospital, Boston. "Diagnosis of Cardiac Conditions."

C. F. Wylde, Montreal. "Embolism of Abdominal Aorta."

F. G. Finley, Montreal. "Cardiac Hypertrophy resulting from Spinal Deformity."

Fenton B. Turck, New York. "Shock and Fatigue, with Pulmonary Changes."

Norman B. Gwyn, Toronto. (a) "Persistent Pulmonary Lesions following Influenza. Lantern Slides." (b) "Massive Collapse of Lungs, Post-operative and Traumatic. Lantern Slides."

John W. Dewis, Massachusetts General Hospital, Boston. "Danger Signs of the Gastro-Intestinal Tract."

A. F. Miller, Kentville, N.S. "Six Years Experience with Induced Pneumothorax, Rœntgenograms, and Remarks on Selected Cases."

Wm. Boyd, Winnipeg. "An Investigation of the Pathological and Clinical Value of Duodenal Tube."

F. A. Lockhart, Montreal. "Uterine Hæmorrhage and its Significance to the General Practitioner."

PUBLIC HEALTH

J. G. Fitzgerald, Toronto. "Graduate Training in Public Health in the University of Toronto."

R. St. J. McDonald, Montreal. "Disinfectants and Disinfection."

C. J. Hastings, M.O.H., Toronto. "How can we more Efficiently Control the Communicable Disease."

H. W. Hill, Director Public Health Institute, London, Ont. "Infant Mortality; Lessons from Vital Statistical Studies in London."

T. A. Starkey, Montreal. "On the Spread of Tuberculosis from New Aspects."

J. D. Pagé, Federal Department of Health, Ottawa. "Immigration Protection."

A. F. Miller, Kentville, N.S. "Institutional Treatment of Tuberculosis; its Limitations."

F. B. Jones, Montreal. "The Chlorination of Small Water Supplies."

Geo. G. Melvin, M.O.H., New Brunswick. "The Abatement of Venereal Diseases."

Chester P. Brown, Quarantine Officer, Port St. John. "Review of a Season's Quarantine Station's Work."

A. G. Morphy, Montreal. "An Appeal for the Epileptics."

C. M. Hincks, Toronto. "Recent Progress in the Mental Hygiene Movement in Canada."

NOTES ON THE MEETING

All scientific meetings will be held in Dalhousie University.

HOTELS

Halifax Hotel.

American Plan only, $5.00 to $6.00; $5.00 without bath and $6.00 with bath.

Queen Hotel.

American Plan only, rooms $4.50 to $5.50. $4.50 without running water, $5.00 with running water, $5.50 with bath.

Carleton Hotel.

American Plan only, $4.00 to $5.50. $4.00 without bath. $4.50 with running water, and $5.50 with bath.

ENTERTAINMENTS

There will be an afternoon Garden Party at Government House; an excursion and moonlight concert on the North West Arm; A harbour excursion and hodge-podge on Lawlor's Island. Other teas, receptions, bridges and dances are being planned.

Resolution adopted at Vancouver meeting, on the presentation of report from Colonel Bruce's Committee, published below:

"Moved by Dr. Mullin, seconded by Dr. Rankin, that Dr. Bruce's report be referred back to the Committee, and that no further action be taken before being again submitted to the Association; furthermore, that the present report, together with such comment as may be available, be printed in the Journal of the Association."

REPORT OF THE COMMITTEE ON THE RE-ORGANIZATION OF PERMANENT CANADIAN ARMY MEDICAL CORPS

PRESENTED AT THE ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION, JUNE, 1920

As the outcome of a resolution unanimously adopted at the meeting of the Canadian Medical Association in Quebec in June, 1919, the following committee was appointed to formulate suggestions based upon their experience in the recent war, having in view the greatest possible efficiency in the Canadian Army Medical Service of the future:

ONTARIO.

Col. Herbert A. Bruce, Chairman, Professor of Surgery, University of Toronto.

Brig.-Gen. A. E. Ross, Kingston.

Col. F. W. Marlow, Professor of Gynæcology, University of Toronto.

Col. J. D. Courtney, Ottawa.

Col. W. B. Hendry, appointed by Faculty of Medicine, University of Toronto.

Lt.-Col. C. L. Starr, Professor of Surgery, University of Toronto.

Major Geo. C. Hale, appointed by Faculty of Medicine, Western University, London.

Lt.-Col. W. T. Connell, appointed by Faculty of Medicine, Queen's University, Kingston.

QUEBEC.

Col. Geo. E. Armstrong, Professor of Surgery, McGill University, Montreal.

Col. Chas. Peters, Montreal.

Col. J. A. Hutchison, appointed by Faculty of Medicine, McGill University, Montreal.

Professor S. E. Grondin, appointed by Laval University, Medical Faculty, Quebec.

Major Harry Morrell, Quebec.

NOVA SCOTIA.

Col. E. V. Hogan, Professor of Surgery, Dalhousie University, Halifax.

Col. John Stewart, appointed by Faculty of Medicine, Dalhousie University, Halifax.

Lt.-Col. J. Hayes, Halifax.

Dr. J. W. Smith, President of Nova Scotia Medical Association, Liverpool.

NEW BRUNSWICK.

Dr. J. S. Bentley, President of New Brunswick Medical Association, St. John.

MANITOBA.

Col. S. W. Prowse, Winnipeg.

Col. R. M. Simpson, Winnipeg.

Lt.-Col. Chas. Hunter, Winnipeg.

Dr. D. G. Ross, President of Manitoba Medical Association, Selkirk.

ALBERTA.

Lt.-Col. F. H. Mewburn, Calgary.

Lt.-Col. Allan C. Rankin, appointed by Faculty of Medicine, University of Alberta, Edmonton.

Dr. D. G. Revell, President of Alberta Medical Association, Edmonton.

SASKATCHEWAN.

Lt.-Col. A. E. Munroe, Saskatoon.

Lt.-Col. T. M. Leask, Moose Jaw, Sask.

BRITISH COLUMBIA.

Dr. Robt. E. McKechnie, President of Canadian Medical Association, Vancouver.

Col. F. C. McTavish, Vancouver.

Lt.-Col. H. C. Ridewood, Victoria.

Dr. I. Glen Campbell, President of British Columbia Medical Association, Vancouver.

It will be seen from the above that the Committee is thoroughly representative of the medical profession in Canada. Care was taken to select men who had had the most varied and extensive experience, both in professional and administrative work in every branch of the medical service in the recent war, and who would therefore have first-hand knowledge of the necessities of a military medical service.

Interchange of ideas has taken place by correspondence and after several months of work the accompanying suggestions have been unanimously agreed upon to act as a basis for the establishment of our Permanent Army Medical Corps of the future, and which, if followed, it is believed will be greatly to the advantage of this organization.

We feel that the country should benefit from our mistakes as well as our successes in the recent war and that the Government will be well advised if it takes advantage of the voluntary work of the members of this Committee, who have no other object in view but the patriotic desire to see the Canadian Medical Service one of the most efficient in the world.

All of which is respectfully submitted in the hope that it will meet with the earnest consideration of the Government and an early reorganization of this, the most important arm of our forces.

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1. The head of the Canadian Army Medical Service shall be known as "The Surgeon-General".

2. "The Surgeon-General" shall have executive authority with a seat on the Militia Council and be directly responsible to the Minister of Militia.

3. In the Event of War:
   (a) "The Surgeon General" shall remain at Militia Headquarters, Ottawa.
   (b) A director of the medical services of the army in the field shall be appointed and stationed at the general headquarters of the force.

4. The duties of the Permanent Army Medical Corps shall be administrative only, except during peace time for station hospitals.

5. A Board of Consultants shall be established, composed of Medical Practitioners of outstanding ability and reputation in all special departments, who shall organize, direct and control all professional matters, including the allocation of the medical duties of the officer selected for service. The decisions of the Board shall be final, except for stated reasons of an administrative character satisfactory to the Board of Consultants.

6. This Board of Consultants should be appointed and assume their duties forthwith.

7. The first duty of this Board shall be to formulate a general scheme of preparedness of the medical services.

8. The nursing service shall be auxiliary to and under the control of the Army Medical Corps. The allocation to duty of nursing sisters shall be under the control of the Consulting Board.

9. A course in Military Medicine should be inaugurated in each Medical College in Canada. This course will include such subjects as Medical History of recent wars; Military Sanitation and Hygiene; Military Surgery; Military Medicine; Military Medical Administration and Organization.

10. The Dominion Government should be asked to provide scholarships in all Canadian Medical Faculties for the encouragement of advances in Military Medical Science.

11. A separate competitive examination should be conducted by the Royal Canadian Army Medical Corps for graduates in medicine applying for admission into the Corps.

12. Successful candidates should be considered on probation for a period of one year while serving in the Corps.

13. At the expiration of their probationary year and before they are taken into the service permanently, they be required to take a course of at least six months' duration in the Royal Army Medical College or some other institution approved by the Military Council.

14. That the Dominion Government make the necessary arrangements with the British Government for the course referred to in the preceding clause, until such time as facilities for such training are available in Canada.

H. A. Bruce,
Chairman.

CRITICAL COMMENTS UPON THE FOREGOING REPORT PRESENTED BY ALLAN RANKIN, M.D.

Commenting seriatim upon the fourteen points of the plan as so far submitted:

Para. 1. Without any conceivable compensating advantages, it is proposed to revert from modern British practice to the use of a title which is reminiscent only of the old days when the Medical Service was without substantive rank or anything approaching adequate recognotion, and existed really not as a military service at all. The retention of the designation by the American Medical Service is no precedent for a service which some time ago abandoned its use. Substantive rank and military titles were given to the Medical Service in British Armies in recognition not only of professional capacity but of the military skill and training shown by the service in applying professional knowledge to the needs of Armies in the Field. The title Surgeon-General, like that of Director-General, is not one indicating rank but only appointment. Furthermore, all the administrative branches of an army: Engineering, Pay, Training, Supply and Transport, etc., are controlled by Directors or Directors-General, with Deputy Directors and Assistant Directors in descending scale, according to the size of the formation with which they are serving. Why should one of the most important administrative services of the army, the Medical, be denied the right to homologate its designations with those of the other administrative branches, as is now authorized? The proposal is only retrograde, with no compensating advantage.

Para. 2. The words "executive authority with" appear unnecessary because heads of administrative services and departments already have executive authority and this bears no relation to a seat on the Militia Council. The importance of the Medical Service in war or in preparation for war may possibly justify the inclusion of the Director-General of Medical Services on the Militia Council. There are advantages in the proposal but there are, also, distinct advantages in having the Director-General of Medical Services responsible to the Adjutant-General, as now.

Para 3. (a) In the event of war.

It is inadvisable to hamper the work of the Director-General of Medical Services in the time of war by such a clause. His whereabouts may safely be left to the Militia Council or to the War Committee of the Cabinet. It is conceivable that, in the event of the despatch of an expeditionary force or in the event of mobilization on a frontier of Canada, the Director-General of Medical Services might, with advantage, proceed with such a force if the organization in the field was considered of greater importance than the organization of reinforcements.

(b) This paragraph is quite ambiguous, bearing in mind the late war with respect to the term "Army in the Field". A Director of Medical Services, overseas forces, or a Director-General of Medical Services, expeditionary force, should be senior to and have jurisdiction over a Director of Medical Services of an army ("D.M.S. Army"). The Royal Army Medical Corps precedent seems safe to follow, especially if Canadian forces are to continue to form part of the armies of the Empire.

Para. 4. The term "administrative" is ambiguous. It seems improbable that the best type of medical men are likely to be attracted to the Permanent Medical Service if they are to be restricted to what is loosely termed "administration." An Army Medical Service can be efficient only if it is efficient both in the medical and the military sense. Self-respect, as members of a military organization, requires a knowledge of military customs and procedure which will enable officers and other ranks to meet their fellows of other services on equal terms as regards soldiership. "Esprit de Corps" is otherwise impossible. On the other hand, adequate professional training is equally essential if the efficiency of the Medical Service is to be such as to enable them to retain the respect of other branches of the service in the discharge of their special duties. The greater part of the duties of consulting physicians and surgeons in the late war could, probably, be termed administrative, insofar as their duties were concerned with categorization and classification for disposal. It is a notorious fact that certain physicians and surgeons of unqualified skill and ability as regards civil practice were so intolerant to discipline and regulations (comprehensibly described by them as "red tape") as to be relatively useless. On the other hand, it is beyond question that certain men of good professional standing in civil life were able to combine administrative and professional functions to great advantage. It may, in fact, be stated, that, as a rule, the smart, well trained physician or surgeon, active in mind and in body, will prove to be a useful commanding officer in a military sense in direct proportion to his efficiency professionally. Two definite inducements are necessary for the attracting of the best type of medical men into the medical service: (a) adequate remuneration; and (b) an opportunity for interesting professional work. This can be obtained within the service in a service of such size and variety as the Royal Army Medical Corps but, in a diminutive service like the Canadian, this is possibly only by periods of study leave or of exchange of duties with the Royal Canadian Army Medical Corps. It follows, therefore, that instead of limiting the duties of the Royal Canadian Army Medical Corps, as proposed in para. 4 by Dr. Bruce, the force should be so increased that it might have a wider experience in the public service generally, whether the Naval, Public Health, Northwest Mounted Police, Indian Service, Quarantine or Immigration, as an army in the field has to deal with all branches of medical science. It should be remembered always that a great deal of the advance in the science of medicine in the British Empire has been due to the work of the Royal Army Medical Corps and the Indian Medical Service. Tropical medicine, in particular, has been furthered more by the British Medical Service than by any other scientific body in the world, the result of the widely varying character of the stations in which they have been on duty. One need mention only the names of Leishman, Ross, Rogers, Stevens, Wright, Wenyon, Balfour, and Bruce. It is further noteworthy that not a few of the directors of the medical service of the British Armies in the field were men who had shown outstanding professional ability as surgeons, physicians, pathologists or specialists of one kind or another.

Para. 5. Board of Consultants:

During the war, both overseas and in Canada boards of consultants existed everywhere, selected primarily for their professional standing, and charged with duties in connection not with the personnel of the Army Medical Service but with patients in hospitals. The duties proposed for them in the report involve the introduction of dual authority in its most pernicious form. The absolute necessity of single control was so emphasized from time to time in the late war that comment seems unnecessary. If a director of an administrative service fails or falls short of requirements, he can be superseded in a few minutes by means of a telegram. The usefulness of an Advisory Board is not necessarily, in any respect, impaired by confining its functions to the making of recommendations and in any event the recommendations of consultants' boards, with regard to the disposal of patients or the relative efficiency of the work done in hospitals by individual medical officers is practically administrative action, their recommendations being considered final, both by the O.C., the Hospital in which they may be for the time carrying out their duties and by the Director-General of Medical Services, under whom they work. As a result of war experience, certain changes in the regulations for the Canadian Medical Service have already been authorized which will place, immediately, at the disposal of the G. O. C. of the District, on the request of his medical authorities, the services of specialists or consultants at any place where permanent troops are in garrison in Canada.

Para. 6. See comments on Para. 5.

Para. 7. The heading of the whole scheme makes reference to the organization of the "R.C.A.M.C." (Permanent Corps). This paragraph would appear to include as well the Medical Units of the Canadian Militia. It would clarify the paragraph if it were more explicit. A further obvious comment upon it is that a Board of Consultants who would undoubtedly be men of high professional standing but with little or no military knowledge or appreciation either of the organization of the Medical Service or of its interrelationships with the other services in an army could hardly be considered qualified by themselves to formulate the general scheme of preparedness for the Medical Services. It seems to be an outstanding feature of the proposals in the report that attention has been concentrated on the work of the distributing zone. One wonders especially how a Board of Consultants selected as suggested in paragraph 5 is to obtain the knowledge requisite for the direction of medical work in the collecting zone and the evacuating zone.

Para. 8. Nursing Service.

It is not understood why the Nursing Service should not be part of the Army Medical Corps rather than auxiliary to it. It has always been under the control of the Army Medical Corps. The allocation of nursing sisters to the different medical units in which they are on the establishment is proposed in the report to be done by the Consulting Board, surely a very cumbersome method. It is not in the least likely that the judgments of the various members of a Consulting Board could be co-ordinated to secure better results than are arrived at by having a disposition made by the Matron-in-Chief, whose decisions are based on information furnished by her own observation and by confidential reports, modified by the changing conditions, usually characterized as exigencies of the service. Confusion of thought is again evident in this paragraph, as between the assignment to duty of the nursing sisters on the permanent establishment and those who would be mobilized for duty in the event of war from the nursing reservice, C.A.M.C.

Para. 9. Concurred in, subject to adequate military control by the District Military Authority of instruction with regard to military medical administration and organization. Such training, if undertaken, should be given only to undergraduates in their final years who have been required to acquire a military training through the medium of the C.O.T.C. The existence of such a military organization in any university should be regarded as a necessary condition for the further specialist training of prospective officers for the Medical, Engineering, and other such technical services.

Para. 10. Concurred in subject to the consideration that educational matters are by law in the hands of the Province which makes the question one of policy for the Privy Council of Canada.

Para. 11. Competitive examinations for entrance on the Permanent Medical Service of Canada, as is the rule with the Royal Army Medical Corps, were instituted by Militia Order No. 281, of June 2, 1911, and examinations were held accordingly in Medicine, Surgery and Hygiene, one paper on each subject. Keeping in mind the recommendation in Paragraph 4, it should be said more explicitly what requirements should furnish a basis for the competitive examination recommended in Paragraph 11. Is this examination to be in administration? If it is to embrace professional work, how can it be conducted by the Royal Canadian Army Medical Corps if their duties are to be administrative only? It is felt that with a service so small as the R.C.A.M.C., the professional qualifications of candidates might very well be accepted as vouched for by the University granting them their degree in medicine. Subsequent promotion should involve additional professional and administrative examinations taken after periods of study leave.

Para. 12. Probation.

Para. 182. King's Regulations and Orders for Canadian Militia states, "All appointments to the permanent staff and permanent force shall be on probation for three years."

Para. 13. Co-operation with the Royal Army Medical Corps and the War Office.

It has been the custom for years that officers of the Permanent Army Medical Corps should take courses in the R.A.M. College, Millbank, and other approved institutions. Officers past and present of the permanent corps to the number of eighteen have, in past years, been so trained, and the procedure is well established under regulations subject to the usual financial exigencies imposed by Parliament in its treatment of the annual estimates.

Para. 14. Arrangements with the War Office.

These have been in force for several years and the British authority has never been approached except to receive most cordial assent and co-operation.

Para. 701. King's Regulations and Orders for Canadian Militia states as follows:

> "An Officer of the Permanent Force or Active Militia may, with the approval of the Army Council (British) be permitted to attend a Course at a School of Instruction in England provided that he is qualified for the course and that the Minister considers that he should attend.

Para. 705 extends the above privilege to N.C.O.'s of the permanent force under the conditions laid down for officers.

Abstracts from Current Literature

SURGERY

Ankylosis of the Metacarpo-Phalangeal Joints. Shaw, C. Gordon: *Med. J. of Australia*, Dec. 18th, 1920, Vol. 2, p. 549.

On the lateral and medial aspects of the metacarpo-phalangeal joints, there are thickened portions of the capsule which receive the name of the lateral ligaments. These fibres arise from a definite tubercle and a depression on the posterior part of the lateral aspect of the head of the metacarpal bone and are attached to the anterior part of the lateral aspect of the base of the phalanx. The writer contends that these ligaments are the main causative agent of ankylosis in this joint in uncomplicated cases. He recommends an open operation for the division of the ligaments. Care must be taken that both ligaments are divided. The hand is then put on a "cock-up" splint and the fingers held in a position of flexion. Movement of the fingers is commenced as soon as the reaction passes, which is usually five days. Much depends on the after care of the hand.

The writer has performed the above operation sn several cases with very gratifying results.

G. A. F.

Bone-Setters, Osteopaths, and Physical Therapeutics.

Bradford, E. H.: *Boston M. and S. J.*, March 17th, 1921, Vol. 184, No. 2.

Dr. Bradford's very interesting article is a plea for a more scientific study of physical therapeutics. He points out that homeopathy flourished because of heavy, nauseous, and needless drugging. Christian Science indicates that psychology and a knowledge of the working of subconscious thought is needed in medical practice. In like manner a prevalence of osteopathy and bone-setting may be due to polysurgery, *i.e.*, excessive operation.

Dr. Bradford points out that the surgical profession of the past generation practiced under the belief that a painful joint always needed rest. It is now known that in convalescent joint conditions, there are important exceptions to this rule. Massage and electricity alone will often not suffice, and joint movement and manipulation may become necessary.

Dr. Bradford points out that one seldom, in ordinary motion of a joint, makes use of that joint's free range of motion. A joint which may move within a certain distance without discomfort will suffer strain in some of the particular ligaments if the act of motion is increased over that used. The ligamentous degeneration following prolonged disuse of a joint is pointed out, and its cure by manipulation through a gradually increasing range of movement.

Dr. Bradford cites a number of cases where patients had suffered through lack of properly applied physical therapeutics.

The article makes a very good case for the careful study of physical therapeutics and a plea for a more intelligent appreciation of its undoubted value. J. A. N.

The Action of the Intrinsic Muscles of the Foot and their Treatment by Electricity.

Sevick, G. Murray: *Brit. M. J.*, March 12th, 1921.

Most of the intrinsic muscles of the foot and the long flexors of the toes play important parts that do not seem to have been recorded. The flexors of the toes raise the longitudinal arch of the foot, because when the weight of the body is thrown forward, as the heel leaves the ground in walking, their action is to draw the heel towards the toes, acting as bowstrings across the arch from heel to toe. The flexor brevis digitorum has the strongest arch-raising action. The transverse arch is maintained chiefly by the dorsal interossei, and this is their most important action.

Description is given how to stimulate electrically the intrinsic muscles of the foot, and good results are promised in hallux valgus, flat-foot and metatarsalgias. It is often difficult or impossible to develop the small muscles by voluntary exercises alone. J. A. N.

The Causes of Cerebral Disturbances After the Ligation of the Carotid Artery, and Ligation of Arteries Without Injury to the Intima.

(Ueber die Ursache der Hirnstörungen nach Karstisunterbindung und über Arterienunterbindung ohne Schädigung der Intima). Perthes: *Archiv. fur Klinische Chirurgie*, Sept., 1920, Vol. 114, p. 403.

Professor Perthes tells of an operative case in 1909 for spontaneous aneurism of the internal carotid in a woman forty-four years of age. The carotid was ligated and the aneurism excised. Eight hours after the operation the patient developed a mild hemiparesis with aphasia, three hours later the condition grew worse—hemiplegia—and she expired on the sixth day.

The autopsy revealed that the anterior two-thirds of the left cerebrum had commenced to soften: the intracranial parts of the internal carotid and the anterior cerebral artery were thrombosed. The posterior communicating artery was more prominent on the left than on the right side.

Perthes is of the opinion that the trouble arises with the ligature by injuring the intima, which is ultimately the cause of thrombosis or embolism, not only in the case of the carotid arteries but also in limb amputation.

The question arises, is it possible to prevent thrombosis? The writer is of the opinion that one can avoid damage to the intima and so prevent the resulting thrombosis. The method which seems to be the best is by tying the artery with a 1 cm. wide piece of free fascia, the knot being protected by suture. The intima is still further protected by placing a double layer of fascia around the artery which is then tied with a strip of fascia protected by suture.

The cause of cerebral softening after ligation of the carotid is either thrombosis or embolism. If ligation of the artery be accomplished without injury to the intima the results will be satisfactory.

A. B. I.

UROLOGY

Papillomatous Epithelioma of the Kidney Pelvis.

McCowan, P. E.: *J.A.M.A.*, Oct., 1920, Vol. 75, No. 18, p. 1191.

The author has collected forty-six cases from foreign and American literature of examples of papillomata of the kidney pelvis, and reports an additional case. This occurred in a woman of fifty-eight, who came for hæmaturia and pyuria. Cystoscopy revealed a papilloma originating within the orifice of the right ureter, which was removed through the cystoscope. The right kidney was shown to be deficient in function and operation was advised for probable tumour. The kidney was removed with two inches of normal ureter. Hæmaturia recurred in three months. Examination again showed a ureteral papilloma which kept on recurring. Complete ureterectomy was then carried out.

Pathological examination showed a dilated pelvis to be lined throughout with a pinkish white, soft and fragile growth, which on close examination was found to consist of villous projections crowded together. The ureter removed later was found to be lined in almost its entire extent by the same growth. The tumour lacked characteristics present in malignant epithelial neoplasms, and was definitely a papillomatous epithelioma.

The growth is rare, judging from cases reported in the literature, though a number were added by surgeons participating in the discussion of the paper. Hæmaturia, painless and intermittent, was the most common symptom. In about half of the cases, extension to the ureter and bladder was present. Nephrectomy is indicated and with it a complete ureterectomy in view of its tendency to be involved. Secondary growths in the bladder may be treated by fulguration.

Eleven of the reported cases showed metastases. It would seem that all cases are potentially malignant.

In the discussion that followed, Dr. Braasch reported that five cases had been observed in the Mayo clinic. The cases fell into two classes; those with and without metastases in the bladder. The majority will have metastases in the bladder. In these cases diagnosis is easier.

Hydronephrosis may occur as the result of an obstructing metastasis in the ureter. There is usually a marked reduction in the function of the kidney involved. Pyelography is most useful and shows usually an irregular partially obliterated outline of the pelvis, together with dilatation of one or more calices.

All those taking part in the discussion were unanimous as regards the necessity of doing a complete ureterectomy when the kidney is removed.

F. S. P.

RADIOLOGY

Radium Element Versus Emanation.

Soiland, Albert: *Am. J. Rœntgenol.*, Dec., 1920, Vol. 7, p. 612.

A comparison of the use of the element with that of emanation can be made from two angles, viz: the financial and the clinical. Viewed from the financial angle, one either can or cannot afford to invest a sum of money sufficiently large to cover a complete emanation station. If money is plentiful, the investment will be one gram or more of radium in solution. If finances are limited, the investment in radium probably will be considerably under one gram of the insoluble salts, for radium in quantities less than one gram does not lend itself readily for emanation purposes. The results obtained from radium emanation or from radium element are exactly alike if an equal energy of radiation is used.

The following is a comparison of the advantages and disadvantages of the two methods of administration:

Element

Is available in small amounts. Can be used quite extensively and with an investment of from $20,000 to $50,000. Requires less space for operation, but requires a 2 per cent. insurance carriage. Tubes, needles and plaques bearing parent radium must be carefully protected from loss in tissues to avoid over action. Has unvarying output of energy and radiation. Can be obtained in suitable form of applicators to meet any requirements. Dosage easily computed. Technique easily acquired. Results readily duplicated.

Emanation

Requires an investment of $100,000 or over. Sealed in vault, requires no insurance, but expense for quarters greater and cost of skilled help increases overhead expenses. Loss of emanation needles of no monetary significance and limited radiation makes loss in tissues immaterial. Has a distinct time limit of activity and a varying loss of its energy until spent. Can be made up in any form desirable to suit each individual case.

A distinct advantage. Technique is more complicated. Results not so readily duplicated, owing to more work necessary to match applicators.

W. A. W.

MEDICINE

The Relation of Hyperthyroidism to Diabetes Mellitus.

Fitz, R.: *Arch. Int. Med.*, March. 1921, Vol. 27, p. 305.

Fitz reports a series of thirty-nine cases of diabetes complicated by thyroid disease. The series is limited but it is of value in that it shows the effect of thyroid operations in the course of diabetes. The conclusions justified are that diabetes usually follows thyroid disturbance, that non-toxic thyroid disease does not effect diabetes, and that thyroidectomy alone is a valueless therapeutic measure in diabetes. Furthermore, certain patients with toxic thyroid disease and diabetes, improve to a considerable degree after the thyroid symptoms are checked, due no doubt to a change in the rate of metabolism.

E. H. M.

Administration of a Pituitary Extract and Histamine in a Case of Diabetes Insipidus.

Gibson, R. B. and Martin, F. T.: *Arch. Int. Med.*, March, 1921, Vol. 27, p. 351.

These writers report a case of diabetes insipidus associated with syphilis, but with a normal sella turcica (x-ray). They confirm the work of previous observers regarding the antidiuretic action of pituitary extract when given hypodermatically, and also that the gland has little action when given by mouth. In this patient the urine volume was decreased from an average daily output of 15 litres to 5 litres by daily doses of from 2 to 3 c.c. of the posterior lobe extract. Lumbar puncture and antisyphilitic treatment gave no relief.

In view of the statement that histamine is the active principle of the pituitary gland, they gave a single dose of 0·2 m.g. of the drug. There was a drop of the urine output to 12 litres during the day, but further use of the drug was impossible on account of the severe headache and prostration which followed the injection. The type of reaction differed greatly from that seen after the use of pituitary extract, and is an indirect proof that histamine is not the active principle of the pituitary, although the latter may be a body of similar chemical structure.

Full chemical studies of the blood and urine under the different conditions of diuresis make the report one of peculiar interest.

D. S. L.

The Effect on Blood Pressure and the Non-Protein Nitrogen in the Blood of Excessive Fluid Intake.

Miller, J. L. and Williams, J. L.: *Am. J. M. Sc.*, March, 1921, Vol. 161, p. 327.

By administering excessive quantities of fluid through a Rehfuss tube the authors studied the blood pressure changes in two cases of hypertension and in one of chronic gout. The patients were given 2½ litres of water every three hours from 9 a.m. to 6 p.m. or a total of 10 litres daily. In one of the hypertension cases the systolic pressure rose from 160 to 287 mm. Hg., the diastolic from 108 to 180, the pulse pressure from 55 to 107. That the volume of the blood was probably definitely increased is shown by the pulse-pressure. The second hypertension case showed an increase in systolic pressure from 200 to 242, in diastolic from 104 to 140. The case of gout failed to show a greater increase than 15 mm. in systolic pressure, the fluid being eliminated almost as rapidly as it was taken. The authors conclude that the degree of rise in pressure depends upon the promptness with which the kidneys function in excreting water.

E. H. M.

The White Adrenal Line (Sergent): Its Clinical Significance.

Kay, W. E. and Brock, S.: *Am. J. M. Sc.*, April, 1921, Vol. 161, p. 555.

In 1917 Sergent described his white adrenal line obtained by stroking of the skin of the upper abdomen, explaining it as being due to a state of hypoadrenia. The authors, from a study of 255 cases, believe that this phenomenon is due to a local vasomotor reflex, resident in the skin, and having no relation to adrenal gland activity. In favour of their contention are the facts that it occurs independently of blood pressure, acute fatigue, or other signs of hypoadrenia; that it frequently occurs in normals and in a variety of diseases unassociated with hypoadrenia; that it reappears in the face of persistent general manifestations of adrenalin subcutaneously administered; and that it has a peculiar association with scarlet fever. It appears that the state of the vasomotor system which allows of its best exhibition is found in young adults of either sex.

E. H. M.

Epinephrin Hypersensitiveness and its Relation to Hyperthyroidism. Peabody, F. W., Sturgis, C. C., Tompkins, E. M. and Wearn, J. T.: *Am. J. M. Sc.*, April, 1921, Vol. 161, p. 508.

The authors review the two procedures in present day use for the determination of functional hyperactivity of the thyroid gland; that is the measurement of the basal metabolism, and the increase in blood pressure and pulse rate obtained after the injection of epinephrin intramuscularly. There is no doubt of the scientific accuracy of the first procedure, but of the second its exact nature is not known. Probably it is a stimulation of the sympathetic nervous system. Their work shows that while a positive reaction is frequently obtained in cases of hyperthyroidism associated with an increased basal metabolism, a negative reaction may be obtained in similar cases even when their heat production is markedly increased. Further, positive epinephrin reactions were obtained in many psychoneurotics, in about 50 per cent. of patients convalescent from acute infections, in a high percentage of military "effort syndrome" cases, and in about 14 per cent. of apparently healthy young men. Their conclusion is that the reaction should certainly not be regarded as having any specific significance in the diagnosis of hyperthyroidism.

E. H. M.

Nocturnal Polyuria. Barach, J. H.: *Am. J. M. Sc.*, April, 1921, Vol. 161, p. 551.

In contra-distinction to the usually accepted explanation of nocturnal polyuria in subacute and chronic nephritis, that is an inability of the part of the kidney to concentrate, Barach advances the idea that it is due to the physiological adjustments in the circulation incidental to sleep. His studies show that these cases have a complete reversal from the normal in the amount of work accomplished by the kidneys during the day and the night periods. It appears to have no relation to heavy evening meals, physical exertion, arterial hypertension, or the horizontal position.

E. H. M.

DERMATOLOGY

The Application of Cutaneous Sensitization to Diseases of the Skin. Engman, M. F. and Wander, W. G.: *Arch. of Derm. and Syph.*, March, 1921.

Researches have been made by these authors in regard to the relationship between certain skin diseases and protein sensitization. Amongst the diseases studied were acne, urticaria, erythema multiforme, purpura hæmorrhagica and the large eczema group. The protein products used were obtained from the Arlington Chemical Company, of Yonkers, N.Y., Squibb, and Parke, Davis & Co.

In carrying out the tests, small incisions were made, one-eighth of an inch long, usually on the inside of the forearm. On each incision was placed a drop of decinormal sodium hydrate, and to this was added a minute amount of the protein to be tested. Thirty minutes were allowed for the reaction to appear, but positive reactions often appeared very much sooner. They point out that cleansing of the skin with such antiseptics as alcohol, was found to influence the reaction markedly, unless a long interval was left before application of the test.

Degrees of reaction were found to vary at different times. Also, persons reacting to a protein of a given group of food stuffs, will often react in a lesser degree to the other proteins of that group.

Positive sensitization was found in 79 per cent. of cases of urticaria, 78 per cent. in infantile eczema, 38 per cent. in chronic general eczema. An almost negligible percentage was found in erythema multiforme and purpura hæmorrhagica, but it is admitted that only small numbers of these cases were investigated.

The writers conclude that cutaneous sensitization by dermal methods is of inestimable value in diagnosis and therapeusis of such skin diseases as those referred to.

H. E. M.

News Items

ONTARIO

Re-organization of the Ontario County Medical Association

The practitioners of Ontario County held a reorganization meeting of their Society at the Ontario Hospital, Whitby, on Friday, May 13th. Dr. F. W. Marlow and Dr. T. C. Routley, of Toronto, were present by invitation, and endeavoured to recount to the local Society, some of the activities of the Provincial Association. A resolution was passed requesting affiliation with the Ontario Medical Association, and the following Officers were elected: President, Dr. S. J. Mellow (Port Perry); Vice-President, Dr. J. McClintock (Uxbridge); Secretary-Treasurer, Dr. James Moore (Brooklin).

The meeting was altogether enthusiastic and interesting.

The meetings of the Public Health Association of Canada took place in Toronto during the week of May 16th to 21st. Many special and interesting addresses by well-known authorities have been given, and it is hoped to give a resume of the proceedings in a subsequent issue.

The second issue of the University of Toronto Medical Bulletin contains a useful article on vaccines and a note of warning on the question of hæmoptysis, the one by Dr. Detweiler, the other by Dr. J. H. Elliott, two very timely articles on subjects of very general interest. A detail of special graduate courses is also given.

The examinations in medicine are being conducted in the various Hospitals of Toronto—the Western, St. Michael's, the Children's and the General. The wealth of the material for examination purposes, particularly in the cardio-vascular line, which St. Michael's has offered, has simplified the work for the examiners though it may have appalled the students. The development of the clinic in this Hospital has been one of the features of Toronto's medical development in recent years. Of more than general interest, is the knowledge that now the pathological material of this institution will come under the observation and care of one of the best-known pathologists of Great Britain, Dr. Magner, of Dublin University. The profession is indebted, we believe, to Sir Bertram Windle for his assistance and interest in the matter, and should congratulate St. Michael's College, St. Michael's Hospital and the great religion they represent on the taking of such a progressive step.—N. B. G.

The Huron County Medical Society met at Wingham on May 11th. There was an excellent attendance. In addition to the general business, a demonstration and talk on "The Diagnosis and Treatment of Pernicious Anæmia" was given by Dr. Norman B. Gwyn.

University of Toronto Medical Faculty

The first issue, vol. 1, No. 1, of a medical bulletin published by the Faculty of Medicine of the University of Toronto, printed by the University of Toronto press, appeared recently. It includes a note on special graduate courses which will be given from May 23rd to May 28th, 1921, and an editorial which we reproduce in full, and two excellent practical details from the Department of Pharmacology and the Department of Medicine.

"The Faculty of Medicine is undertaking to fulfil its duty to the profession in the Province as a state institution in a number of ways. It is seriously handicapped in this endeavour by being over-burdened by a large number of under-graduates, there being more students in the last three years than in all the years of any other first-class medical school on this continent. In spite of this fact, the Faculty provides facilities to practitioners to enable them to keep abreast of the progress being made in the various branches of medicine either (1) by attending undergraduate courses by the week or month, or (2) by extension lectures, or (3) by short "refresher" courses in the holidays. Ten or fifteen practitioners avail themselves of the first method every year; over fifty extension lectures have been delivered before some twenty local Medical Societies; and the Special Graduate Course last Christmas was attended by fifty medical men.

"As many cannot avail themselves of these advantages, this publication is being issued by the Faculty to every practitioner in the Province, calling their attention to the subjects and dates of refresher courses and containing short, pithy articles on recent advances of medicine, written especially for the practitioner.

"The necessity of the practitioner definitely urging his patients to breast-feed their babies is emphasized in the first article, while in the second, a typical history of a case of Auricular Fibrillation, showing the results of rational treatment, is described.

"Attention is drawn to the three Graduate Courses to be held at the end of May of this year, for which application should be made at once, as the number admitted to each course must necessarily be limited. The clinics given at these courses are specially prepared to aid the practitioner in both diagnosis and treatment.

"Members of the profession are urged to consult the list of Extension Lectures issued by the Ontario Medical Association, of which about one hundred are contributed by the Faculty of Medicine, for the purpose of asking their local Medical Society to avail themselves of this opportunity of keeping in touch with recent medical advances.

"The Faculty are anxious to meet the needs of the practising doctor and would therefore appreciate any suggestions that can be made whereby the University can assist him in his every-day work."

BRITISH COLUMBIA

THE recent attempt of the Chiropractors, Drugless healers and Optometrists to secure special legislation for the unrestricted practice of their respective arts was opposed by a committee consisting of representatives of the Council of the College of Physicians and Surgeons of British Columbia, the British Columbia Medical Society and the Vancouver and Victoria Medical Societies. This representative committee of the profession took the view that in addition to their own protection it was obviously their duty to protect the public, and to demand from any cult practising medicine that its members should show some familiarity with the systematized knowledge of the human body in health and disease, or in other words that they should be able to recognize disease when they saw it.

During the revision of the Medical Act, in 1909, the Osteopaths secured recognition but only by conforming to the provisions of the Act and by qualifying in the canonical subjects, as well as in passing examinations in their own peculiar practice.

Such has worked out quite satisfactorily, and the precedent seemed adequate for the present case, satisfying the demands of the profession. Apparently the committee of the legislature which considered the question was of the same opinion, as the following report will show, and be it noted the report was unanimous:

Mr. M. A. Macdonald presented the Second Report of the Select Committee appointed pursuant to Resolution on 9th March, as follows:

LEGISLATIVE COMMITTEE ROOM,

March 29th, 1921.

MR. SPEAKER:

Your Committee appointed to inquire and report in respect to the proposed Drugless Healing Bill, being No. 23, and the proposed Chiropractic Bill, No. 24, beg to submit as its final report the following:—

As on the inquiry into the proposed Optometry Bill, exhaustive evidence was also presented to the Committee, for and against these proposed Bills. The Committee had the views, apparently of the most prominent representatives of the drugless healing art and of the best practitioners in chiropracty, in support of these measures, while the Medical Council, represented by prominent and reputable members of the medical profession, opposed both Bills.

Your Committee have taken great pains to consider with the utmost care the evidence adduced and the representations made, particularly as a great many estimable citizens have apparently received benefit from the chiropractors. Whether these alleged results are more imaginary than real or whether they have yet been sufficiently tested over a long enough period of time probably remains to be seen.

As in the consideration of the Optometry Bill—so in respect of these two Bills—your Committee had the benefit of the exhaustive report of Mr. Justice Hodgins, referred to in the previous report of this Committee. His report is voluminous and is quite applicable to the principles under consideration.

The general education obtained in Canada through the medical faculties of the Universities is, your Committee believe, well abreast of the times. The course has been gradually enlarged to keep pace with expanding medical knowledge, and research institutions in different parts of the world are engaged in enlarging the boundaries of medical knowledge, with an open mind to new discoveries possessing merit. On the other hand, it is difficult, from the evidence submitted, oral and documentary, to ascertain the educational standards or scientific knowledge of those who profess to find in the practice of chiropracty and drugless healing a cure for a great many, if not all, ills.

From the curriculums before us of several American Institutions, and the statements made, it would appear that the standards required and the length of time required for study vary, and on the whole are not long enough to afford sufficient training. It would appear, too, that these schools are without the necessary equipment. It is therefore not possible to say that the medical attainments of those now asking for a change in the law are sufficiently high.

The question to be decided by the Committee is this: Have the chiropractors and the drugless healers made out a case for an alteration of the present law, so that without hindrance they may be permitted to practise the healing art?

One of the leading Chiropractic Colleges in the United States is the "Palmer Institute". Dr. B. J. Palmer, the head of this institution, in giving evidence in the case of the State *vs.* Jansheski, in December, 1910, when asked whether, when a patient came to a chiropractor, he was asked the history of the case, answered: "No, because it be of no value"; and in answer to why that was so, said: "A person comes to us without telling us what the trouble is; it makes no difference whether a physician has already diagnosed it as insanity, appendicitis, indigestion, or anything they call it. The chiropractor needs to know nothing about that case from a physician's standpoint; it is immaterial, yet he can take that same case, put it down on his benches and analyse that spine just as accurately without knowing those things; in fact, sometimes, I think better. . . . It is not essential the chiropractor should know what the patient said he had, but you can adjust the current for it running into the organ, and the patient is well. That is where chiropractics becomes purely a mechanical proposition, a mechanical and electrical-making circuit proposition in a man."

The definition of this treatment in technical terms was given by McNamara, of the Universal Chiropractic College, Davenport, Iowa. as follows: "The theory sustaining this system presumes that in consequence of displaced vertebra the inter-vertebral foramina (openings) are occluded (closed), through which the spinal nerves pass. . . . In this way the nerves are pinched, and chiropractors assume that such pinching is responsible for 95 per cent. of all diseases. Chiropractic concerns itself with an adjustment of the subluxations, thus removing the pressure on the nerves."

Reducing it to simple language, the chiropractors affect to find traces of practically all diseases in subluxations of the spine, and their treatment is confined to the manipulation of the spine by hand. It is rather a shock to even the superficial knowledge of the layman, to be told that 95 per cent. of all diseases finds a manifestation in the spinal column. The assertion is emphatically disputed by members of the medical profession, and if knowledge, training, and research is necessary to arrive at a conclusion on such a question then certainly the medical fraternity are better able to give an opinion than the followers of these cults.

One of the chiropractors examined claimed to have cured such a wide variety of diseases as chronic colitis, kidney stone, dropsy, chronic biliousness, rheumatism, chronic ulcer, ulcerated stomach, tubercular spine, rickets, etc. These diseases, they say, manifest themselves by a displacement of the spine. The spread of disease by germs would appear to be of secondary consideration. In fact, one chiropractor stated that, granted the lung was normal, one could swallow tubercular germs by the million and never take the disease. The same witness, speaking of kidney stone, averred that a man's vertebra must show a subluxation, otherwise he would not have a stone in the kidney.

It would seem apparent that the health and safety of the public is involved in the indiscriminate application of theories such as these to the cure of disease. Public safety is indebted to medical science for the prevention of the spread of contagious diseases; for sanitary regulations and hygienic precautions, the failure to observe which would be disastrous. The standard of knowledge must be maintained at a high point and there must be some recognized body who from training and experience are competent to fix these standards. That recognized body hitherto has been the Medical Council, and your Committee can see no reason from the evidence adduced why it should not continue to exercise these functions in the future.

The fundamental requirement in the treatment of disease is ability to make a diagnosis. It is essential to first know what the trouble is before attempting to cure it. That involves a knowledge of and study of certain standard subjects. Your Committee do not believe for a moment, from the evidence, that the only diagnosis necessary is to feel for certain alleged displacements in the spinal column.

We concur with the statement of Mr. Justice Hodgins, whose investigations occupied many months, involving personal examination of these chiropractic institutions, that: "I cannot bring myself to the point of accepting, as part of our legalized medical provision for the sick, a system which denies the need of diagnosis, refers 95 per cent. of disease to one and the same cause, and turns its back resolutely upon all modern medical scientific methods as being founded on nothing, and unworthy even to be discussed."

Your committee do not doubt that beneficial results have been obtained from the treatment of chiropractors. They have no reason to doubt the word of estimable people who say so. It must be borne in mind, however, that the most of these are chronic cases, and it sometimes happens that by the power of suggestion good results are obtained, particularly in neurotic cases. The Committee were given instances of marvellous cures of shell shock cases during the war as a result of mental suggestion. No doubt new discoveries have been made, and will continue to be made, in medical science; but it is hardly likely that any discovery will enable us to safely dispense with the elementary requirement of diagnosis in the treatment of diseases, and to diagnose it is necessary to have a wider knowledge of the anatomy and of fundamental subjects than simply a certain familiarity with the spinal column.

The chiropractors object to the Drugless Healers Bill, and the latter object to the proposed legislation of the former on the ground that their Bill is all-inclusive. It is sufficient to say, in reference to the Drugless Healing Bill, that the various branches of study pursued by them are simply special courses which are recognized in medical work. This is true of all the branches of treatment referred to in this Bill, except chiropracty. These different types of treatment are carried on by the drugless healers at present really as laymen without sufficient qualifications for the work. They should qualify under the "Medical Act", and then if they so desire specialize in these particular branches.

Notwithstanding the foregoing views, the Committee do not feel that chiropractors or drugless healers should be prevented from practising. We only say that they should first be qualified. They should, before being permitted to practise within the Province, pass an examination satisfactory to the Medical Council, on the following primary subjects: Anatomy, physiology, chemistry, toxicology, pathology, bacteriology, histology, neurology, physical diagnosis, obstetrics, gynecology, minor surgery, hygiene, and the principles and practice of chiropractic. Before taking this examination they should be graduates of a recognized school or college of chiropractic which at least teaches a residence course of three years of six months each year.

The Medical Council in prescribing examinations for applicants for registration as chiropractors should appoint at least one of their number to set the examination in the principles and practice of chiropractic. After passing the examination outlined above they should be registered as a member of the college.

The suggestion that chiropractors would be discriminated against in examinations is not based on fact, as the method of conducting examinations by the Council, by number rather than by name, makes this impossible.

Your Committee therefore recommends that the "Medical Act" be amended to include these provisions. It would be a guarantee to the public that all practitioners were qualified practitioners—a most desirable thing. The chiropractors would prefer to set their own standards and have a Statute providing for a governing body of its own. This would not be safe, or in the public interest. They are doing medical work, curing or attempting to cure disease. It is the accredited representatives of the medical profession—if they are honest and fair, and there has been no suggestion to the contrary—who are best fitted to prescribe the necessary standards.

This report represents the unanimous views of the Committee.

We submit the evidence herewith.

M. A. Macdonald,
Chairman.

Resolved, That the House, at its rising, do stand adjourned until 2 o'clock p.m. to-day.

And then the House adjourned at 12.45 a.m.

A. M. Manson,
Speaker.

Book Reviews

Infectious Diseases. A Practical Text Book. By C. B. Ker, M.D. (Ed.,) F.R.C.P. (Ed.,) Medical Superintendent, City Hospital, Edinburgh, 627 pages, 32 full page plates, including 5 colour photographs and 7 colour plates, 68 charts. Price, $12.00. London, Oxford Medical Publications. Toronto, McAinsh & Co., Limited, 1920.

The first edition of this book appeared in 1909. A second edition was called for in 1914 and almost completed when the war intervened. Appearing now, the second edition has many alterations and additions necessitated by the large amount of work done on the infectious diseases during the past ten years. The diseases dealt with are: Measles, Rubella, Scarlet Fever, Smallpox, Vaccinia, Chickenpox, Typhus Fever, Enteric Fever, Diphtheria, Erysipelas, Whooping Cough, Mumps and Cerebro-Spinal Meningitis There is a splendid chapter on fever hospital problems in which the author writes fully from his own wide experience and discusses such pertinent questions as cross infections and their solution. The experience of other hospital directors also finds a place here.

The book is a valuable monograph on the diseases with which it deals, giving as it does the writer's own observations and dealing only with those diseases which come into his own field. The Schick reaction and other new and important work on infectious diseases find a place and are impartially discussed.

It should be welcomed by all public health departments and hospitals, and the general practitioner will find it a storehouse of information. It is well written and fully up to the standard of the best of the Oxford Medical publications.

J. H. E.

Exophthalmic Goiter and its Nonsurgical Treatment. By Israel Bram, M.D., Instructor in Clinical Medicine, Jefferson Medical College, Philadelphia. 438 pages. Price, $6.50. St. Louis, C. V. Mosby Company, Toronto, McAinsh & Co., Limited, 1920.

In the earlier chapters of this book, the author deals with the anatomy and physiology of the thyroid gland, the pathology pathogenesis, symptomatology, diagnosis and differential diagnosis of Graves' disease; other chapters deal with diagnostic tests, the course and prognosis of the disease. Having dealt very fully with these features to which some 200 pages are devoted, he then passes on to the subject of nonsurgical treatment. He says, "I consider exophthalmic goiter a morbid process belonging strictly to the realm of the internist. Surgery in the usual, ordinary, everyday case of exophthalmic goiter is a fallacious procedure." His discussion which leads up to this opinion is illuminating and he quotes many authorities, surgical and medical to support this contention. He details in full the methods he feels should be applied in treatment and gives the results of a number of years experience. Among his conclusions we read, "Careful nonsurgical management, then, is capable of completely and permanently curing nearly every case of hyperthyroidism. The occasional exception not responding to nonsurgical measure is not an instance of genuine Graves' disease, but is one of malignant degeneration of the thyroid gland, a case of toxic symptoms superimposed upon a long-standing nontoxic goiter, or a case brought to the clinician's attention in a moribund condition. The author, in unison with others interested in thyroid therapy, does not hesitate to conclude that he has been able to cure every case of Graves' disease that was able to come to his office; this was accomplished in from six months to two years, depending upon the exigencies of the case treated."

The first portion of the book is an excellent monograph on the subject of exophthalmic goiter, and the latter part a strong presentation of the author's views upon treatment. J.H.E.

FRACTURED FEMURS. By M. G. PEARSON, O. B.E., M.B., B.Sc., F.R.C.S., Brevet Lieut-Colonel South African Medical Corps, and J. DRUMMOND, M.D., M.R.C.P., Captain South African Medical Corps. 92 pages, 50 illustrations. Price, $3.50. London, Oxford Medical Publications. Toronto, McAinsh & Co., Limited.

This little work presents an excellent and comprehensive description of the methods evolved by the authors in the treatment of fractured femurs at special femur hospitals both in France and in England.

These methods may be briefly summarized as to essentials into:

1. The use of the "Thomas" splint, with the addition of hinged bars for the support of the leg from knee down.
2. Extension by calipers applied to the femur slightly above the condyles.
3. Early mobilization of the knee.
4. Suspension of the ring of the splint to prevent it slipping upward past the Tuber Ischii.
5. The use of a sectional bed of special construction.

The reasons for these various points being insisted on, are given in clear crisp language, as are the descriptions of the various details concerned in carrying out the methods.

The results achieved are in themselves quite sufficient evidence as to the surgical soundness of the methods described, and when one considers that a large proportion of the cases were of the compound comminuted type the end-results must be described as most gratifying.

The contents of this volume warrant for it a very wide circulation and it should be read and studied not only by every hospital surgeon, but also by every practitioner of medicine, who may at any time be called upon to treat a fractured femur. E. R. S.

AN EPITOME OF HYDROTHERAPY. For Physicians, Architects and Nurses. By SIMON BARUCH, M.D., LL.D., consulting physician to Knickerbocker and Montefiori Hospitals. 205 pages with illustrations. Price, $2.00. Publishers: W. E. Saunders Company, Philadelphia and London, 1920.

EPITOMES are not always to be commended. This epitome is not only well written and its facts clearly stated, but it is also well illustrated. The author is well known as an enthusiastic advocate of hydrotherapy, a method of treatment to which he has devoted the better half of his professional career now extending over the half century. In the present small volume not only are exact directions given as to the technique of procedure to be followed in the various baths, packs and compresses but also many causes of failure are pointed out which by more careful technique could be avoided. We are ourselves convinced of the value of hydrotherapy when properly applied and after reading over carefully this small volume can recommend it as an excellent guide to an important method of treatment. A. D. B.

PUBLIC HEALTH AND INSURANCE. BY SIR ARTHUR NEWSHOLME, Lecturer on Public Health Administration at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore. Cloth, 8 volumes. Johns Hopkins Press, Baltimore, Md.

This collection of addresses, made by Sir Arthur Newsholme in America from Toronto to New Orleans, and from New York to California, embraces a wide range of the very livest subjects now before the medical profession. They relate largely to his studies as Medical Officer of the Local Government Board, England. His lecture (III) on the increasing socialization of medicine, and that (VI) on the Inter-relation of various social efforts, dealing though they do with English developments, bear very directly on the problems facing Canada and the Canadian medical profession with its allied groups, Dentistry, Nursing, Public Health. Hospitalization has increased in England and Wales so that where 11 per cent. of deaths occurred in public institutions in 1881, 20 per cent. occurred therein in 1910; while in London, Eng., these deaths increased from 20 per cent. in 1881 to 40 per cent. in 1910. About one in four of the total population of London, Eng., received free medical aid in voluntary institutions in 1908. Of 24,000 medical practitioners in England and Wales, 5,000 are poor-law doctors, about the same number are in the Public Health service. Sir Arthur estimates that three-fourths of the British Medical Profession undertake contract work under the National Insurance Act, which includes about one-third the population of Great Britain, now, and if wives and children were insured under this act also, would include about two-thirds of the total. It applies to all manually employed receiving less than £250 per year. He quotes approvinly Dr. H. S. Beadles, thus—"The medical attendance given under the National Insurance Act . . . is an absolute failure and amounts to little more than first aid, carried on at an enormous cost." Sir Arthur says that the National Insurance Act constituted a great stride in the socialization of medicine, but was made ill-advisedly: and requires that many false steps be retraced, before it can be satisfactory to the public or the profession. He urges from the disastrous British experience that "it is for *Physicians* to guide the course of events" (in the inevitable developments that are coming). We may not all agree with all he says; but certainly this point is obviously true. He believes therapeutic and preventive medicine should be linked up and under central control, and that every medical practitioner should be trained to investigate each case of illness from a preventive as well as from a curative standpoint. This implies an ideal situation truly—and we must all confess that ætiology is perhaps the last subject on which the mind of the "busy practitioner" rests. But how the active therapeutist is to find time for the distractions of such investigations—involving as they do Sherlock Holmes work of the most intricate and time-consuming sort in the majority of cases—Sir Arthur should explain. Only if the therapeutist is on salary and moreover is limited to a given number of treatment cases per day could he begin to follow, satisfactorily, the trails of the ordinary infections. Moreover, the therapeutic mind and the ætiological mind are of two distinct types—as distinct as those of the clergyman and the crime-detective in other fields. We have no quarrel with training the practitioner in such work, as we have no quarrel with training the clinician in laboratory work. But in practice, times must change indeed before the clinical man can find time or opportunity to make for himself the diphtheria, tuberculosis, typhoid or Wassermann tests he may require in dealing therapeutically with his patients; and even move before he can thread out the routes of infection by which his patient with a hæmorrhage became infected with tuberculosis or his diphtheria patient came to need the antitoxin or the intubation which the clinical man must furnish.

Clear-cut discussion of many problems cognate to the main one—including an excellent review of the present status of tuberculosis from the ætiological, social and preventive standpoints—make this set of lectures one that every physician should read if he desires to become posted on the great medical question of to-day—which is "Quo vadis?" H. W. H.

MEDICINE FOR NURSES. By JOHN HENDERSON, M.D., Ch.B., F.R.F.P., S.G., Visiting physician, Glasgow Royal Infirmary, Professor of Medicine at St. Mungo's College, Glasgow, Lecturer-Examiner in Clinical Medicine, Glasgow University, Lecturer and Examiner in Medical Nursing, Glasgow Royal Infirmary, pp. 263. London, Edward Arnold, 1921. Price 8/6 net.

The reviewer's first impression is favourable, the text being well written and free from errors in typography and English as is the case in most English books. The plan of the book is excellent and is arranged to provide a nurse with that information concerning disease which will secure more intelligent co-operation in the treatment of the patient. For a practical book, however, it is strikingly lacking in details. For example, the use of Mustard and Linseed poultices is mentioned but no directions for their preparation are to be found. Again under pediculi it is stated that "all nits are to be removed" yet no hints are given as to how this may best be accomplished. Under Ringworm the nurse is told "every precaution must be taken to prevent its spread to other parts, and to other people," and no instructions how this is to be done. For Migraine "any possible source of irritation is to be removed", and no suggestion what is to be sought as a cause. Under Broncho-pneumonia and Pneumonia the nurse is told that cardiac failure is to be guarded against, and directions are given for the treatment of heart failure, but the nurse is not told what signs or symptoms she must watch for, and this is surely more important than the treatment which is the field of the physician.

The nursing of the tuberculous is not well written, is wholly inadequate and lacks essential detail. For relief of cough only medicines are suggested, the usual non-drug treatment which falls within the nurse's sphere being quite ignored. The author's valueless generalization and lack of detail leads him to write "For early cases a cold dry climate is most beneficial, as that of Davos or Canada" which is a fair example of many such worthless statements. The paragraph dealing with Diabetes does not give a fair representation of the accepted treatment of to-day.

If the author would rewrite the nursing instructions with some attention to details he would have a book of some value to nurses, otherwise delete all such paragraphs and leave the book as a nurses' compend of diseases with an outline of general treatment. J. H. E.

The advent of the *American Journal of Hygiene* is extremely welcome. It meets a long felt want on this continent, for hitherto there has been no journal devoted specially to matters of Hygienic interest,—and for a good few years the amount as well as the quality of research work done on this continent has been such as to warrant such a journal.

One feels quite sure, that in the hands of Dr. Welch and his board of able assistant editors the journal will not only be assured of a great welcome but that implicit reliance may be placed upon the good quality or high standard of work handled by it.

The present articles form a good augury of the future. They show that the standard aimed at is high,—and one cannot fail to be impressed by the vast amount of painstaking and accurate work connected with these papers.

They are all connected with Hygienic matters of great importance and without wishing in any way to make distinctions the researches on Yellow Fever by Noguchi are particularly valuable, for the evidence he brings forward seems fairly conclusive that he has found the organism answerable for the disease.

The further issues of the Journal will, I am sure, be looked forward to with great eagerness by all interested in Hygienic matters. T.A.S.

SIX PAPERS BY LORD LISTER, with a short biography and explanatory notes by SIR RICKMAN J. GODLEE, BART., K.C.V.O., M.S., Surgeon in Ordinary to H.M. The King, etc., etc. With four plates and an autograph letter. London: John Bale, Sons and Danielson, Ltd. Ten shillings net.

Two years ago we reviewed in these columns the life of Lord Lister, by Sir R. J. Godlee, and we are sure that all who have read this book will be glad to know of another by the same gifted author, in which they may study Lister's work in his own words, in a series of selections from his Collected Works. This work has just been published and is the first to appear of a new series of Medical Classics.

It was no easy matter to make a suitable selection, a selection which should exhibit the quality and range of his studies, and give an idea of the great labour and sheer genius displayed in his researches, but we may say at once that the selection is admirable.

The first is from the paper on the Early Stages of Inflammation, being the fourth section of this remarkable contribution to science, read before the Royal Society in 1857, when Lister was thirty years of age. This paper shows him as an investigator in physiology, making original observations and deducing new laws. We learn something of his intense application, his ingenious hypotheses, his logical arguments, and the inflexible resolution with which the truth seeker submitted every speculation to the arbitrament of experiment. We are also impressed by the ingenuity with which experiments were designed and the deftness of the manipulations required. A few drawings with which the paper was illustrated, are reproduced.

The second selection is the article on Anæsthetics, which was contributed to Holmes' "System of Surgery", in 1861. This paper is a good illustration of the philosophical way in which Lister brought physiology and pathology to support his views on anæsthesia. His researches on this subject are among the labours of Lister which have been ignored or forgotten by surgeons.

The third selection is the epoch-making paper, "On a new method of treating compound fractures, abscesses, etc.," which first appeared in the *Lancet* in 1867. Only one remark need be made on this paper: It is the most important surgical paper ever written. It opened a new era in medical history, and Surgery, no longer hampered and checkmated by a "hidden hand", became free from the fear of a fickle fate, and "sweet with certainties."

The next contribution appeared in the *Edinburgh Medical Journal*, Vol. xvi, 1875-6, as "Demonstrations of Antiseptic Surgery, before members of the British Medical Association." This was "a stirring and important occasion; the large theatre in the old Royal Infirmary occupied by four or five hundred members, mostly general practitioners, but with a good sprinkling of surgeons, the former with open minds but sceptical, the latter for the most part either simply incredulous, or strongly opposed to Lister and all his works." And yet this was the most brilliant period of Lister's career. Ten years of ceaseless toil in laboratory and hospital ward had proved him right in his application of the Germ Theory and "his reputation was firmly established in Scotland, Scandinavia and Central Europe, but in England his influence was not great far south of the Tweed, and in London it had done little more than ruffle the stagnant pool of old-fashioned surgery." Such demonstrations as these were the daily privilege of students who followed Lister's clinics, and the visitors, for the most part foreign, who came to see for themselves, but it was the first occasion which Lister had had of showing his method of operating and of dressing wounds before so large a gathering.

They saw the carbolic spray, of course, and this seemed to many superficial observers the chief factor in Lister's work, but they heard him say, "If we could dispense with the spray no one would rejoice more than myself," but, with the bacteriological beliefs of that date, the use of the spray was justified. They saw much more than the spray. "Many of the audience saw things they had never seen before." They saw new principles in surgery, and operations done with equanimity and confidence which had never been described in text books. They saw inflamed and tuberculous joints opened freely, ununited fractures treated by open operation and wiring, excision of varicose veins, suture of veins, arteries ligatured in their continuity, for aneurism, or in wounds, with catgut and the ends of the ligatures cut short and buried in the wound. They saw operation wounds of all kinds healing without suppuration, as the rule and not the exception. They saw bloodless operating, and they saw organizing blood-clot.

The fifth paper is a good illustration of Lister's purely scientific investigations, and shows him as a pioneer in the new science of bacteriology.

It is an exposition of Pasteur's work on Fermentation, supplemented and extended by his own on putrefaction, and, incidentally describes the method by which he secures a pure culture of the bacterium lactis. It was the Introductory Address delivered in King's College, London, on October 1st, 1877, when he entered on his duties.

The last paper given is that read at the International Medical Congress in Berlin in 1890. A quarter of a century had passed since he had begun his work on antiseptic surgery. That work was now crowned with success, his principles had been adopted by surgeons all the world over, and Medicine recognized him as one of its greatest masters. Yet the address was largely a tribute to the discoveries and successes of others; he referred to his own work with characteristic modesty, dwelling on his own earlier difficulties and mistakes, and explaining the reasons for changes which had from time to time been made in his practice.

The biographical sketch with which the book opens is a fascinating chapter in which the personality of Lister is revealed perhaps more vividly than in any previous writing. It gives the chief events in his life, gives some account of his discoveries in histology and pathology, notes the various stages in the evolution of antiseptic surgery and, in something of Lister's own spirit, finds some explanation and even excuse for the extraordinary apathy and antagonism with which the New Learning was received by his own countrymen, "doubtings and discords" which make a sorry contrast to the serene indomitable patience and faith of one who built on the "solid ground of nature".

The author is modest in forecasting the verdict of history on his illustrious relative. "Possibly some captious critic may doubt his originality because he did not invent the germ theory himself, but none can deny that he was the first to grasp its bearing on wound treatment, and the first to proclaim the necessity and the possibility of making surgery aseptic. . . . It will have to be allowed that he showed what the new surgery was to be by performing operations that had previously been considered unjustifiable and that it was only by following his example that the enormous advances of the last half century have been made."

He tells us that "as Lister grew older he looked back with fond affection to his early physiological and pathological work. It troubled him to see how far it had been forgotten and he feared that

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THE ÆTIOLOGY OF EPIDEMIC INFLUENZA
A CRITICAL REVIEW

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and

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THE recent and widespread outbreak of epidemic influenza has been the occasion for very extensive research regarding the cause of this disease. In many places the clinical material was only available during a short local epidemic and for this reason the preliminary experiments were often intensive and not fully developed until the epidemic had passed. The present time, therefore, would appear to be favourable for reviewing the more important results of these investigations.

Epidemic influenza is notably a pandemic disease and manifests itself by an unusual number of clinical conditions. In the recent literature there have been excellent descriptions, both clinical and pathological. The more severe form was the acutely fatal influenzal pneumonia. The lungs of these cases presented pathological findings that have only been seen during epidemics and were recognized as typical of epidemic influenza. There were, however, during these periods cases of all degrees of severity, the mildest showing only acute fever, headache, general pains and weakness for a few days, and having no lung involvement. These milder cases were considered to be epidemic influenza because they occurred during these periods. But until a causative agent has been found for both mild and severe forms it will be impossible to decide whether or not they are manifestations of the same disease. The clinical pictures of the milder types are seen in non-epidemic years and yet they are not diagnosed as epidemic influenza. No doubt sporadic cases continually occur—the virus must in some way be maintained between epidemics—but such cases can not at present be recognized with sufficient certainty to furnish experimental material. The ætiological agent must be sought in typical cases during epidemic periods. The sporadic cases can then be elucidated by demonstrating that they result from the same virus.

Two views regarding the nature of this virus have occupied the attention of most investigators. The first, originally advanced by Pfeiffer, regards *B. influenzæ* as the causative agent; the second, of more recent date, believes that the disease is due to a filterable virus. Rosenow, [1], [2] it may be added, has isolated a green producing *streptococcus* from cases of influenza and obtained experimental evidence which led him to believe that it is the cause of influenza. His work, however, has not been confirmed.

When considering these two views in detail one has to keep in mind the conditions that must be fulfilled before one is justified in concluding any virus to be the cause of influenza. An admirable discussion of this point has been written by Fildes and McIntosh[3]. Briefly stated the conditions are those which Koch laid down for himself in his studies on the ætiology of tuberculosis. These are as follows:

1. The virus should be capable of being recognized in a large proportion of the cases of the disease, preferably in relation to the chief lesion.

This may be accomplished by staining the tissues, by cultivation on nutrient media, or by reproduction of the disease in animals.

2. The virus should be shown to be living. This may be demonstrated either by growing several generations of the virus, or by carrying out several animal passages.

3. The virus should be capable of reproducing the disease in other animals.

This condition offers several difficulties. The inoculation of the animal should be made with a pure virus. It is necessary to choose a susceptible species and a suitable route for the introduction of the virus. Should the animal become ill it is required to demonstrate that the disease in question has been reproduced and to recover the virus from the diseased animal.

The demonstration of immune bodies, particularly agglutinins in the serum of patients is not to be considered as indicating that the agglutinated organism is the cause of a disease. The agglutination of *B. proteus* by the sera of typhus patients is a case in point. The presence of immune bodies, either in patients or infected animals, is, however, of considerable confirmatory value.

Filterable Virus

Several workers have reported negative results from the inoculation of volunteers and animals with filtered materials from influenza cases.

Lister and Taylor[4] sprayed the nasal cavities of fifteen men with filtered nasal washings from early cases.

Wahl, White and Lyall[5] inoculated six men with filtered extract of influenzal lungs by introducing it into the nose and naso-pharynx.

McIntosh[3] inoculated monkeys, rabbits and guinea pigs with filtered nasal washings, sputum and lung juice.

Keegan[6] and Roseneau[7] reported similar results.

Nicolle and Lebailly[8] observed symptoms of influenza in two volunteers inoculated subcutaneously with filtered sputum; also in two monkeys inoculated under the conjunctiva and by nasal instillation with the same sputum unfiltered.

Dujarric de la Rivière[9] was himself inoculated subcutaneously with filtered influenzal blood and afterwards had symptoms of influenza.

Such negative or indefinite results can hardly be regarded as more than suggestive.

The first extensive experiments supporting a filterable virus as the cause of influenza were reported by Bradford, Bashford and Wilson[10]; Gibson, Bowman and Connor[11]. The former described a minute, filter-passing organism which they found constantly in cases of influenza and which they were able to grow by special cultural methods. Inoculation of monkeys and guinea pigs with these cultures resulted in symptoms and lesions that were noted as typical of influenza in man. The organisms were recovered in pure culture from the animals.

Gibson, Bowman and Connor independently isolated an organism which both groups of workers considered identical with that described by Wilson. They produced "typical experimental influenzal lesions" in monkeys, rabbits, guinea pigs and mice by inoculating them with the cultures, and recovered the organism from the animals. The lesion regarded as typical was a peculiar type of hæmorrhage into the lung. This they were able to transfer from one animal to another by reinoculating the Berkefeld filtrate of hæmorrhagic lungs. The same lesions were seen in animals inoculated with blood and sputum from influenzal patients. Therefore the organism was considered to be the virus of the disease.

At a later date Bradford and Wilson in a note appended to a criticism of their cultures by Arkwright[12], retracted their claim that a filter-passing organism had been grown in pure culture and stated that degeneration forms of bacteria and protein particles in their cultures had been mistaken for such an organism. This retraction may also be applied to the work of Gibson, Bowman and Connor, for they state that they were in agreement with Capt. Wilson that their "organism" was the same as he had found.

Further light has been shed on the nature of the lesions found in the animals through experiments carried out in our laboratories[13, 14]. During the epidemic of influenza in Toronto early in 1920, guinea-pigs and rabbits were inoculated with filtered material from influenza cases. None became ill but when they were killed a few days later approximately half of them had lung changes. These were of two types. The most striking lesion was hæmorrhagic. Sometimes the lungs were spotted with small areas of hæmorrhage 2 or 3 mm. in diameter, seen on the pleural surface and on section. In other cases they coalesced to form irregular larger areas that extended into the lung substance. The most extensive change involved the larger part of one or more lobes. No fibrin was seen. Congestion and hæmorrhages were occasionally found in the tracheal mucous membrane and the trachea contained frothy fluid.

Microsopically the hæmorrhage varied in extent. The smallest lesion was extravasation of red cells into the alveolar walls. In places this broke through the walls into the alveoli. Where it was most extensive the air-holding tissue was almost completely obliterated, a few empty alveoli standing out prominently in the midst of an area of solid hæmorrhage. Various grades of the same lesion were to be found in the same section. In places there was also œdema. In some cases the lumen of the bronchi contained red blood cells. Two striking features of the hæmorrhage were the absence of leucocyte reaction about it and the absence of hæmosiderin in the cells of the lung tissue.

The second type of lesion was proliferative. In the gross it could not always be detected. Microscopically it consisted of a thickening of the alveolar walls due to proliferation of endothelial cells. Where the change was least, the outline of the alveoli could be easily traced but the air space of the lung was considerably lessened. In places of greater change, single alveoli were completely obliterated by the proliferation; others nearby were only a small fraction of their original size and the outline of the alveolar walls was lost in the diffuse mass of cells. Where this was most marked, the tissue was solid and the air space entirely obliterated. The cell masses included capillaries. Giant cells were occasionally seen. A recent thrombosis of a small branch of pulmonary artery was associated with this type of lesion.

Although some lungs showed only proliferation it was common to find hæmorrhage as well. The picture presented by the combination did not suggest that the two processes had a common cause or that one resulted from the other. Both the hæmorrhage and the proliferation occurred alone so definitely and so frequently that their association appeared to be accidental and could not be construed as signifying a more fundamental relationship.

By passing an extract of a hæmorrhagic lung through a Berkefeld filter and reinoculating the filtrate into another guinea pig we found that the lesions were reproduced in the lungs of the second animal. In one instance they were carried through seven reinoculations, in another series through six, and in another th ough five. By employing a special technique an attempt was made to obtain cultures of a virus from human and animal material but without success. Some of the cultures became turbid and showed very fine regular bodies much smaller than bacteria and very difficult to stain, but the same features appeared in cultures of control material. Although none of these cultures contained ordinary bacteria, guinea pigs inoculated with them showed the typical lesions.

The hæmorrhage was undoubtedly the most singular and striking lesion in our animals and corresponded to that described in the articles already mentioned[10], [11], as typical of "experimental influenza" in animals. One of these authors[11], who examined our specimens in our laboratory, agreed with us that they were the same lesions as they had obtained.

After the Toronto epidemic had subsided we incolulated a series of guinea pigs with control material from healthy patients who had not had influenza. The animals were killed after a similar interval. In their lungs exactly the same lesions were found, and in the same percentage as after inoculation with influenzal material. We then killed some healthy guinea pigs from our stock pens,—pigs that had never been inoculated. They too showed the same pulmonary lesions; and in order to determine if some condition peculiar to our pens was responsible for their production, guinea pigs from another laboratory were killed, with the same result. In view of these controls it was quite apparent that the animal lesions had no connection with the infective agent of influenza.

Further experiments[14] were made in an endeavour to explain their causation and resulted in demonstrating that the hæmorrhage was an agonal phenomenon due to the method of killing. Our routine had been to give the animal a blow on the back of the head. It was shown that hæmorrhages did not occur when the guinea pigs were killed by a sudden incision with sharp pointed scissors which opened the chest wall and the ventricles of the heart with one snip. But they did occur, in a small percentage of animals killed by bleeding from the vessels of the neck or by rapid chloroform anæsthesia.

The histology of the proliferative lesion showed it to be essentially a slow inflammatory proliferation of endothelial cells. The exact ætiological agent was not determined although there were some reasons for suggesting that it might be due to *B. bronchisepticus*.

The lesions described by Bashford, Bradford and Wilson; Gibson, Bowman and Connor, have thus been accounted for. They were evidently not the result of the virus of epidemic influenza and one is not able to deduce from their experiments that such a virus is a filter-passing organism.

Similar lesions have been obtained by others and advanced as evidence of the operation of a filterable virus. Major Milton W. Hall[15] inoculated filtered sputum from influenza cases into rabbits, guinea pigs and mice. The animals showed no uniformity of clinical symptons and many remained in perfect health. They were killed by a blow on the back of the neck. The lungs showed hæmorrhages, the description of which corresponds remarkably in its details with that which we have given above. The hæmorrhagic areas were regarded as undergoing organization resulting in irregular masses of large mononuclear cells, in some places retaining the outline of the alveolar walls. The photograph of this "carnification of thickened alveolar walls" is undoubtedly the proliferative lesion that we have described. The lesions were transferred through as many as nine animal passages by reinoculation of lung emulsion. However, when viewed in the light of the possibility that the lung changes were agonal phenomena or a spontaneous animal disease, there would not appear to be any evidence in them to indicate that a filterable virus is the cause of influenza.

Olitsky and Gates, in a series of papers[16],[17],[18],[19], have reported experiments made during two epidemics and the period between. They inoculated rabbits intratracheally with filtered and unfiltered nasal washings obtained from cases of influenza during the first thirty-six hours of symptoms. In the absence of bacterial infection no animals died. They were killed by a sharp blow which dislocated the cervical vertebræ. The respiratory organs only were affected. The typical pathological change consisted, in the gross, of hæmorrhage, œdema and emphysema. The appearance of the hæmorrhagic areas was like the typical lesion we have described. Microscopically the lungs showed foci of hæmorrhage, œdema and emphysema. The aveolar strands were infiltrated with large cells of a foreign nature. Although mononuclear cells were seen in the alveoli and interalveolar walls there does not seem to have been any prominent leucocytic reaction. The œdema appears to have been greater than in our lesions but on the whole there is a striking resemblance between these lungs and those we have described. A comparison of our sections with those figured by Olitsky and Gates[18] shows a picture almost identical with that which we have obtained in control animals and by special methods of killing, and we do not feel that these lesions are characteristically similar to those found postmortem in epidemic influenza in man.

By reinoculating affected lungs the lesions were transferred through several animal passages, rabbits and guinea-pigs being used. They found that washings from patients later in the disease produced lobar consolidation, when any lung changes were found. Control animals inoculated with washings from non-influenzal cases did not show the "familiar clinical and pathological action". A few developed lobar pneumonia and others gave "inconstant effects".

Blood changes were also observed. The change corresponding to the typical hæmorrhagic lung condition was a leucopænia largely due to decrease in the mononuclears. The lobar infections were associated with a polymorphonuclear increase and the unaffected lungs were not accompanied by any great change.

In a later communication[20] small bodies were described which appeared in anærobic cultures of influenzal material and which passed through a Berkefeld filter. Animals inoculated with these bodies showed a leucopænia, a decrease in mononuclear cells, and at autopsy the typical lung lesion.

To what extent this evidence warrants one in concluding that these bodies are the virus of influenza and that the typical clinical and pathological changes in the animals are due to the operation of this virus is a matter for discussion. The typical pulmonary lesions bear a very striking resemblance to those described in our experiments, so great in fact that it seems probable that the method of killing has been a factor in producing them. By itself the leucopænia has no very great significance, at best such changes are only corroborative evidence of reproduced disease. The culture and recognition of filterable organisms is open to many pitfalls and in the absence of any more definite evidence it would seem justifiable to wait for further confirmatory work rather than to accept at once this virus as the cause of epidemic influenza. But, from the fact that with inoculation of normal material and a definite method of killing the same hæmorrhagic picture was obtained by us, we are not inclined to accept either the observations of Olitsky and Gates or the English observers.

At the time of going to press, a preliminary report of experiments by Loewe and Zeman[36] has appeared. They have cultivated a minute filter-passing organism which they state does not appear to differ from that isolated by Olitsky and Gates. The cultures were obtained from nasopharyngeal washings of influenza cases. Rabbits inoculated intratracheally were killed after one or two days and showed "characteristic" lesions. Cultures were obtained from the rabbit lungs, and emulsions or filtrates of these lungs produced similar changes in other rabbits, several animal passages having been made. The pulmonary lesions were of the same order as described by Olitsky and Gates and so far as we can determine from the preliminary report, their experiments are open to the same criticism as we have applied to the work of Olitsky and Gates and the English investigators.

B. INFLUENZÆ (PFEIFFER)

This organism was discovered by Pfeiffer in 1892 who advanced it as the cause of epidemic influenza because he recovered it in pure culture from many cases during that outbreak. He did not succeed, however, in reproducing the disease in animals. Further study of hæmoglobinophilic bacilli, of which Pfeiffer's organism was the original type, revealed a large group of organisms having the common property of requiring blood pigment for their growth. *B. influenzæ* formed but one type.

Pfeiffer recognized another group which he called pseudo-influenza bacilli. Davis[21] considers this to be a heterogeneous group, morphologically the same as *B. influenzæ*, the organisms of which have little else in common with one another except their hæmoglobinophilic property. They have been found in a variety of diseased conditions and in normal tissues.

Stillman and Bourn[22] investigating sputum from cases of influenza and pneumonia and the pharyngeal secretions of healthy people found typical *B. influenzæ* and pseudo-influenza bacilli which differed by having the property of hæmolyzing blood agar, the typical group causing no hæmolysis.

It is the typical *B. influenzæ* of Pfeiffer that has been considered by some to be the cause of influenza.

During the recent pandemic it was present in a large percentage of cases, associated with other pyogenic organisms. The latter were regarded as secondary invaders and chiefly consisted of *streptococcus, staphylococcus, pneumococcus, micrococcus catarrhalis and B. mucosus capsulatis.*

The percentage of cases in which *B. influenzæ* was demonstrated varied considerably both in different localities and in the same place at different times. This was also true of the secondary invaders, and for this reason some have regarded *B. influenzæ* as having the same relation to the disease—viz., a secondary invader following in the path of some specific virus which had primarily affected the respiratory organs.

However, it must be admitted that *B. influenzæ* has been demonstrated in relation to the chief lesions of the disease in a sufficiently large percentage of cases to warrant one in considering it as having fulfilled the first requirement of Koch's postulates. The fact that it occurs in other diseases and may be present in normal throats during epidemic periods or between them, and that it is present in a varying proportion of influenza cases, do not in themselves rule out the possibility that it might be the cause of the epidemic disease.

The most important evidence, however, comes from inoculation experiments.

Probably in no other connection have so many volunteers offered themselves for the investigation of disease.

Roseneau[7] sprayed the nose, throat and eyes of nineteen men with an emulsion of living *B. influenzæ* containing thirteen strains, some of which had been recently isolated from lungs of fatal cases. None of the men became ill.

Lister and Taylor[4] introduced into the mouth and nose of nine men, living suspensions of three stock strains of *B. influenzæ*. All but one remained well and his illness could not be considered as an attack of influenza.

Wahl, White and Lyall[5] inoculated five volunteers with large doses of four strains, one being the first subculture from a fatal case. None of the men became ill.

Yamanouchi, Sakakima and Iwashima[23] sprayed pure cultures of *B. influenzæ* and mixed cultures of the common cocci into the nose and throat of fourteen healthy people and did not cause any illness.

Sellards and Sturm, and Bloomfield have also reported negative results.

Cecil and Steffen[24], on the other hand, inoculated the nose and throat of six volunteers, who became ill. Two were given massive doses of saline suspensions from agar, two received peritoneal exudate from a monkey, and for the last two a blood broth culture was used. In each case an upper respiratory infection was produced. Considering the size of the doses the saline suspensions caused surprisingly mild infections; the growth from one chocolate agar slant was used for one patient and that from two slants for the other. Smaller doses of the fluid cultures gave better results. The local symptoms resembled an acute coryza and were more striking than the constitutional disturbance. "The systemic reaction in the experimental disease was not so profound as in true influenza and resembled more the prostration that accompanies a severe cold or bronchitis." The absence of fever in the cases was also unlike epidemic influenza. The authors conclude that "virulent bacilli, when injected into the nose and throat of healthy volunteers, may excite in them an acute respiratory disease similar in many respects to influenza, but falling short of the typical clinical picture."

Thus attempts to reproduce epidemic influenza in man with *B. influenzæ* have been markedly unsuccessful and the results suggest very strongly that this organism is not the primary cause of the disease. There is general agreement, however, that it played a part in producing the pneumonias, but in the light of these experiments it would appear to have been present as a secondary invader.

Blake and Cecil[25, 26] have worked extensively with animals. Two groups of monkeys were inoculated,—one group by way of the nose and throat, the other by intratracheal injection—with a strain of *B. influenzæ* from an empyema following influenzal pneumonia. Its virulence was increased by passage through eleven mice and the peritoneal cavity of thirteen monkeys before it was used for the experiments.

The question arises as to what findings one would require in the animals, as a result of inoculation, to support *B. influenzæ* as the cause of the disease in man. In animals clinical signs are suggestive but in themselves not conclusive. Decisive evidence would come from the character of the pathological changes in the respiratory organs and the association of the ætiological agent with them. As a standard of lung lesions to be expected from *B. influenzæ* there are on record [27, 28] the descriptions of human lungs from patients who have succumbed to a pure infection of this organism.

The first group of animals consisted of twelve monkeys which received as much as 3 c.c. of a blood broth culture or peritoneal exudate from another monkey. Signs of upper respiratory infection followed, in five complicated by acute sinusitis. None of the animals died. Nine were killed in from three to six days. At autopsy three showed bronchopneumonia, from two of which *B. influenzæ* was recovered. But the organism was also recovered from three without pneumonia, although two of these had tracheo-bronchitis.

The second group comprised eleven monkeys inoculated intratracheally. Five received massive doses, the growth from our four or five plates having been used for each animal. They were killed in from two to six days. Four had bronchopnuemonia, but only two yielded cultures of *B. influenzæ*. Cultures from the other two were sterile. The fifth monkey showed tracheobronchitis but no pneumonia. As a control a massive dose of killed organisms was given to the sixth monkey. It was killed on the sixth day and showed bronchopneumonia. The remaining five received the growth from one plate or the equivalent amount of peritoneal exudate from another monkey. They were allowed to live for from one to seven days. Three had bronchopneumonia, two of which yielded no *B. influenzæ*, the other giving a culture from the bronchus. The fourth had tracheo-bronchitis and sterile cultures, and the fifth did not become ill.

When these results are analyzed for evidence capable of being applied to the elucidation of the ætiology of influenza in accordance with the foregoing discussion, it is seen that only three animals had a bronchopneumonia associated with *B. influenzæ*. The monkeys inoculated with massive doses cannot be included in the evidence because a similar dose of dead organisms also produced bronchopneumonia. Six animals with lung lesions yielded no *B. influenzæ* and on this account cannot be considered as satisfactory evidence, although it was possible that the organisms had died out.

The bronchopneumonia of the three animals, shown by culture to be due to *B. influenzæ* was compared with post-mortem lesions of human lungs in which a pure *B. influenzæ* infection had occurred. There was agreement in some particulars but the pictures were not the same. Because of this discrepancy and in view of the lung changes without associated organisms, and the production of bronchopneumonia by killed bacteria, the value of the experiments has been somewhat impaired. The experimental method has considerable merit, as shown by the clear out transference of measles to monkeys which has recently been reported[29], so that if *B. influenzæ* had been the virus of influenza one would have expected more decisive results than were obtained. A bronchopneumonia was initiated by *B. influenzæ* which in some respects resembled the human lesions but it is not possible to conclude from the experiments that this organism is the cause of epidemic influenza. In fact the authors themselves do not make this claim.

The theory has been advanced that a special strain of *B. influenzæ* with a markedly exalted virulence might have accounted for the epidemic. That variations exist has been demonstrated by several observers.

Cohen[30] found that strains from meningitis differed in agglutination and protection experiments and produced a fatal septicæmia in rabbits.

Stillman and Bourn[22] have made cultural distinctions in the production of indole and the fermentation of saccharose.

Recently in this laboratory two strains of *B. influenzæ* have been isolated from the same patient, one from the sputum the other from the lung at autopsy. The former was a coccoid bacillus, fairly uniform in size and shape, the latter a slender bacillus whose length was 1·5 to 4 times the width. The difference in morphology definitely indicated that the organisms wer not alike and this was further borne out by agglutination. An immune rabbit serum prepared from a third strain, having a titre of 1 in 2560 for the homologous organism, agglutinated the autopsy strain in a dilution of 1 in 1280 and failed to agglutinate the sputum strain in a dilution of 1 in 20.

Thus the finding of *B. influenzæ* in sputum should be controlled whenever possible by culture at autopsy since the strain in the sputum may not be identical with the one obtained from the diseased tissue. As the latter organism is the one likely to be taking part in the infection the culturing of sputum only, may lead to inaccurate conclusions.

Bell[31] has noted three main morphological types, the two we have just mentioned and a third, consisting of fairly long slender straight or curved bacilli with pointed ends, which we have also seen. These types did not correspond to agglutination groups. In one case two strains, isolated from one plate, differed in morphology but were identical by agglutination tests. In another case three strains isolated from the same plate differed in both morphology and agglutination. Most of his strains were not alike and he concluded that the group is heterogeneous but that identical strains do occur.

Valentine and Cooper[32] in Park's laboratory did agglutination and agglutinin absorption tests on 171 strains with 25 sera and could not detect any serological relationship by this means. Continuing this work in the same laboratory Povitsky and Denny[33] obtained similar results. They found that 185 strains from influenza cases were almost unrelated, five being the largest number to fall into any one group. Some meningitis strains had more in common, four out of seven belonging to the same type.

Cocoa and Kelly[34] have confirmed the r sults of Valentine and Cooper. The argument has been advanced by Park[35] and his assistants, supported by Cocoa and Kelly, that if *B. influenzæ* had been the primary ætiological agent a pandemic strain would hav existed, and therefore organisms obtained from cases in different places and at different times would have belonged to one type as revealed by agglutination tests. But the results did not reveal any such pandemic strain and therefore they belive the conclusion is warranted that *B. influenzæ* is not the primary infecting agent.

Summary

At present we believe there is not sufficient evidence to indicate what is the cause of epidemic influenza. There is no experimental certainty that the virus is a filter-passer. The experiments which favour this view have been criticized in the light of results obtained in this laboratory.

B. influenzæ i undoubtedly present in a large but varying percentage of cases, and is a factor in producing the pathological complex of the disease. However, the failures to inoculate man form impressive evidence that it is not the primary infecting agent. The failure of animal inoculation and the absence of a pandemic strain are further facts in support of this view. The evidence favours the opinion that *B. influenzæ* is a secondary invader.

The difficulties of making any advance in the problem arise mainly from the want of exact knowledge as to the *essential* lesions of the milder forms of epidemic influenza, and therefore of the lesions in animals which would indicate a reproduction of the disease.

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MEDICAL ORGANIZATIONS IN ONTARIO AND THE PRESENT NECESSITY

ANNUAL ADDRESS OF THE PRESIDENT OF THE ONTARIO MEDICAL ASSOCIATION

J. Heurner Mullin

Hamilton

In appearing before you at this time I am expected to unburden my soul, and cause you to suffer as you bear with me until this effort is completed. In those matters in which we differ, I crave your indulgence. Throughout the past year I have had to sail the treacherous sea of public opinion and have endeavoured to play my humble part in guiding the ship between the extremes of reactionary and radical opinions. How to be progressive and not too radical for the present age, is indeed the question. I agree with the words of a popular author of the day, "But one-third of the population of the world is yet civilized. Centuries hence a unified civilization may complete the circle, but human nature and progress must act and react a thousand times before the earthly millenium, and it cannot be hastened by dreamers and fanatics." In pursuance of the time honoured custom, I intend to present for your consideration, a survey of social problems as they are to-day, of things which now, or may in the near future, affect us as a profession.

It is impossible not to recognize that the old world is being turned upside down. Probably it seemed ever thus to many. It is a great privilege to live in such an age when history is being written so quickly. We should admit that the great social revolution which has been prophesied, is already with us. That more or less unconsciously changes are taking place which may lead to even more radical changes in our social order.

The complexities of our civilization have a tendency to conceal our mutual interdependence. It is now just as imperative as it was in the primitive state, to obliterate individual selfishness, and demand of the present sane and modern elements of society, the recognition of their duties towards other members of the community. Should not the members of each group band together for efficiency of that service, which their group must render not only in their own, but in the interest of the public at large.

The medical profession as one of such groups has always been inspired by the highest ideals. In this process of re-adjustment it is certainly important that to-day we should have our eyes open and our ears to the ground. The question of complete care of health of all members of the community is definitely interlocked with all social questions of the day. As with them its proper solution must be arrived at without selfish class opposition on the one hand, or failure of co-operation through ignorance on the other.

Years of experience in daily service have given us a wide knowledge of social conditions and a sympathetic appreciation of the weakness of human nature, of the social as well as medical afflictions which come upon various members of the community. If we study the various conditions as they are presented, our profession can be of greater service to the community in the understanding of our problems in the new social order, than any other one profession or class, not excepting the clergy.

The older religions have laid emphasis on sacrifice. The test of one's faith has been one's willingness to make personal sacrifice; to give one's money, property, self and life to a cause. What the world needs most to-day is not sacrifice in the old sense but a complete rebuilding with the forces available.

We are in business to secure the means to live lives as full as our ability and ideals will permit, to get money to sustain ourselves and family and to have the means to protect us against the time of uncertainty in years to come.

In certain walks of life with the education available, men are prompted to apply their talents, not for service, but for the gain; even to be mere gamblers if more money can be obtained in that manner for their own pockets. There are too many parasites about us getting their own profits from the efforts of other members of society and sucking or squeezing out of the public a living out of all proportion to their individual value to all the other members of society.

So long as many act entirely for themselves without regard for the rest of the community, society has not yet been organized to provide the best in life. The individual must learn that he who produces and serves in the interest of his neighbours will most surely reap benefit for himself.

Welfare work, charity and certain reform movements, in so far as they keep alive improper conditions, are negative forces. What the world needs most are the constructive forces which will find the remedy and this, in the interests of the whole human family. The instinctive sense of loyalty and obligation to one's own family needs to be expanded to embrace all mankind.

Men once looked to the past as the golden period of mankind. Then lived great men and good. Religions taught that we could be saved by turning thoughts back to those glorified days, and that salvation depended on believing. Our religion should also teach that salvation requires doing some practical work for the community. "Faith without works is dead." This applies to both the individual and the group.

What then is the duty of the medical profession in these stirring days? Who are we, and for what do we stand? By what authority can we even answer these questions? To what extent does our nominal organization represent our profession as a whole? Whose fault is it if it fails to speak for the many? How long will it be, before every unorganized member of our group will realize that as such, he is a menace to himself, a check on the progress of his class and a shirker in the battle of life.

It is now past forty years since the initial steps were taken in the matter of voluntary organization of the Medical Profession in this province. Circulars were sent to all local societies and many prominent physicians, asking for their opinions regarding the proposed organization. All endorsed the scheme, with one exception, and he feared that a Provincial Association would injure the Dominion Association. Thus we had in its very inception, the same bug-bear which is evident in another form to-day. A Provisional Committee was appointed in February, 1881, and soon after, the first meeting was held in the Spring of that year.

From this time until recently, the Association stood for little more than an Annual Meeting, an early summer excursion, an opportunity for amusement and social activities, with scientific discussions thrown in.

The various stages in our recent reorganization are well known to many, namely: the recognition of the local society and its affiliations in its representatives in the Committee of General Purposes, the division of the Province into Counsellor Districts, the Counsellors as members of our Board of Directors.

During the past year we have seen the advantage of calling together the members of the profession in eight of our Counsellor Districts, where scientific programmes of real interest were presented for their mutual advantage, on each occasion. Our experience during the past year amply justifies the advisability of continuing such Counsellor meetings as annual events, and making it possible in greater measure for all the members, and more especially their Executives and delegates, to receive information regarding the activities of the central machinery; to present suggestions or receive advice, and to take some active and real interest in the discussion of the many problems which are affecting our profession.

What are some of these problems?

Let us assume that we represent an intellectual class, and that our chief object in life is to provide a service in the interest of humanity of a highly specialized character.

Discussions regarding any revision of medical practice pass from the stage of apathy or scorn, to a violent and impossible opposition which too often savours of self-interest.

Should we not recognize that during the last two or three generations our plan for medical practice has not kept pace with changes in our social life? It is only fair to ourselves to admit that our plan for service to the community as a whole is incomplete and unsatisfactory in many respects. Some change is absolutely needed in the interest of the whole public body and is already at our doors.

As a remedy for such deficiencies, State Medicine has been proposed, as the perfect panacea. It may be necessary to admit that in the future of medical practice there must be more governmental control, both in the way of higher standards for admission into practice, and later even a continuous control for the maintenance of these standards. After careful study are we prepared to admit that any plan which has been yet tried, or yet publicly suggested really supplies the need as we understand it at the present time?

"State Medicine" as we know to-day, it should rather be considered as a threat, not a solution, indicating what will happen to our profession if we quietly sit by and watch the activities of those who are outside our ranks; who without our aid, will surely establish some system which is unsound in principle and can never give complete satisfaction in practice. We have a right to demand that under all conditions, our standard of living should not be lowered from that which we, as a class, now enjoy. A sufficient opportunity for study and recreation should be available in any routine which may fall to our lot.

Under any system the aim must be to ensure to every individual in the community, a satisfactory medical service, without requiring him in time of great distress to accept charity or go into debt. He must be given every opportunity for exercising his unbiased judgment in the selection of his medical attendant, guided it may be by some standardization or reporting house system for our members in practice. He should not be so completely at sea as he now is. Too often the public makes selections on purely sentimental or personal grounds.

Just how much preventive work will be expected of the man in actual practice, or whether it is advisable to entirely separate these branches of service, is a question regarding which there are groups lined up on either side. Already we find examples of our so called Preventive Group overstepping the bounds in Child Welfare and Venereal Diseases. The treatment of Tuberculosis is almost completely out of our hands. I believe that a valuable opportunity will be lost, both to such communal branches of service, and to ourselves, if such are permitted to extend without our co-operation and interest.

We now have a strong committee known as the Committee on Interrelations of the Medical Profession and the Public, who as we know from their report, are studying the various suggestions already offered, and are keeping in touch with all current literature bearing on the subject of medical service in all its phases. Similar committees must be appointed in every local unit and machinery must be created whereby each is kept constantly in touch with information available on this subject in our Central Office. The meetings of such committees in our local units should be open to their membership at large and by means of Round Table discussions or otherwise, a greater interest and much useful discussion be thoroughly stimulated.

With such information before the profession, an intelligent understanding will be possible. We will have a large group of men prepared to represent our professional requirements when the legislators begin to take a hand.

A phase of state medicine is already with us, namely, the work under the Workmen's Compensation Act. There are too many of our members who are not satisfied with the treatment they have received. Some change is necessary in the plan of administration of this Act.

In the industrial world to-day, we hear from excellent authority that their are four parties to be considered in the bargain,—Capital, Management, Labour and the Public. Under the Workmen's Compensation Act we form a large portion of the Labour group, and as such, in their argument, we should have a very definite opportunity for expressing our opinions by having a regular representative on the Board, appointed by the Government.

In the meantime we know that a much better feeling would result under some system of intimate co-operation with this Board, whereby our Directors or certain other representatives appointed by us would act voluntarily in an advisory capacity. These could present complaints or assist in the adjustments of misunderstandings.

What about your dealings with Sick Benefit groups, the Lodges and other forms of contract work, including the great Industrial Corporations? Are the arrangements which they make with the individual members always fair to these, or is it a case of competitive buying in the cheapest market? We should certainly have some minimum standard for the guidance of those who wish to undertake this kind of work, not only in this province, but anywhere in our Dominion. The present Life Insurance fees are a sufficient example of this without further comment. These and other problems have been more fully dealt with in the reports of various Committees of our Association.

We will have no right to demand a hearing unless we are prepared to show that we are in a position to render service, and to guarantee the best service possible under varied conditions, we must clean house from within. We must not only correct or remove the cause for inefficiency amongst ourselves, but undertake a reasonable degree of education of the public along the lines of the most modern scientific developments if we are to receive their complete co-operation in the maintenance of our standards and ideals.

Education must always be the first essential in any plan for the improvement of medical service for the public. The science and practice of medicine is ever changing. Advances in methods of diagnosis and treatment should be made available for all members of the community through the individual doctor in each particular case.

The profession can be kept in touch with these advances by means of the literature of the day, by frequent scientific meetings in large or small groups. A good library and an active society in each community is an asset in favour of the public. The real value of this cannot be represented in dollars and cents.

In many communities it is impossible for the medical man to leave his work in order to make himself more proficient, not only in latest advances in the elementary sciences, but in ordinary clinical routine work. We have attempted to offer a solution by making available in each County Society or local unit, post-graduate lectures direct from our universities.

As a profession, we must sympathize and cooperate with those who at great personal sacrifice of time and energy, have done so much to upbuild our great medical teaching institutions, for the benefit of those who are merely students, preparing themselves for their life work.

Having received assistance from the public funds for the development within their own walls, it is only fair to ask that their experts devote at least a small portion of their time each year for the benefit of the profession in practice and through them, the community at large in various parts of the province.

It is hoped that further demands will be made by each of our local units; that they will insist on their rights and through whatever means possible, persuade those who supply these funds to still further increase the opportunity for this service.

Surely the Government of this province has reached the stage in its development when it must pay more attention to the providing from the public purse, for greater assistance for this higher education. Many branches of teaching must be developed along special lines and true research encouraged. Adequate salaries must be paid to all the workers in all departments, and it should be unnecessary in this democratic age to look with longing eyes to the possible periodic munificence from our plutocratic benefactors.

Our post-graduate courses and teaching must not stop with didactic lectures on strictly scientific subjects. These must be extended to hospital wards wherever clinical material is available.

Our hospital beds must be increased in number. Patients no longer find it convenient or possible to remain in their homes. The question of shortage of nursing aid, both fully trained or otherwise, or even domestic help, drive many to hospitals who would have preferred to have stayed at home. Many problems in careful diagnosis and treatment whether medical or surgical, can only be properly taken care of in a well organized hospital.

We must make provision to elaborate an extensive hospitalization programme, which will take into consideration the actual needs in all of our small communities. It should be unnecessary for many of the patients and their friends to travel miles from home to some famous clinic, often at great expense and personal risk or injury. Each of these community hospitals should be thoroughly standardized according to a minimum plan.

Those interested directly in the administration of such Hospitals should not be satisfied until all members of the community where they are located, will have the privilege of, and reason for a complete confidence in the work conducted therein.

A plan for hospital standardization has been developed which depends on the following features: (a) Careful preparation and care of all scientific records. (b) Complete laboratory service to assist in this. (c) Careful study of such records by the group of medical men attending each institution.

The study of these records, in an impersonal manner, will supply an abundance of clinical material not otherwise available. This plan of hospital standardization is no fairy story or fantastic dream, but is in actual operation in scores of institutions on this continent to-day. This does not seem much to ask when the interests of the public are vitally concerned.

This community hospital becomes the health centre of the district, the place of meeting for the local practitioners, a democratic and unselfish group clinic wherein we can continuously provide a system for the development of the general man along scientific lines. It may even be necessary in some of our communities to take active measures to re-establish in the public confidence, "the doctor of the old school" the Dr. McClure type, in "The Bonnie Briar Bush." This man knew the various members of the family, their most intimate personal affairs, from the cradle to the grave. No change in medical practice for the sick can possibly find a reliable substitute, provided we can keep him up-to-date.

In the development of our present machinery for preventive measures, our public health departments, every inducement should be offered to interest the majority of the general practitioners in all communal work. Their association with such activities would increase their interest in their routine work as it effects the individual in their practice. They would have unlimited opportunity for education of the public in all measures which may be formulated in the interests of the public. We are now only beginning to touch the fringe of future possibilities.

The elaboration of this plan for standardization to include diagnostic clinics, would remove the possibility of many unnecessary operations or treatments, and in other instances render valuable services to the community.

A consultant staff will undoubtedly be necessary in many forms of work, These may be developed within the group, or may be brought in as occasion demands from a larger centre. Such consultants, either in their communal or private work, should always be ready to render expert service when required by their brethren, and not so completely concerned with commercial advantages as too often we find many of the so-called specialists of to-day. The buying and selling of patients, otherwise called "fee splitting" is another example of commercial enterprise and should be prevented by some amendment to the Criminal Code. The taking of any part of fees by any system of secret graft, without actual service rendered, and without the knowledge of the patient, should more properly be called "theft".

If the specialist is not too busied with an egotistical appreciation of his own importance, he should recognize the part which the well trained general man takes in the community—services more valuable on critical occasions than any money can repay. The honest consultant should use every possible opportunity for assisting the public to properly understand the value of such services, and to pay a reasonable honorarium for the same. The real consultant should recognize his continuous duty in this education propaganda. In the future many of our now so called special procedures will become routine with all general practitioners.

Over specialization has been tried across the Border to the south, and has been found wanting. The best elements of their public are doing some thinking, and resent having to call in ten or fifteen specialists at once or at various times in order to have efficient routine care of their families in the simplest form of illness.

The six-weeks' specialist, or the bumptious novice, who soon after graduation decides to limit his field to some specialty, has been a serious factor in unsettling the public mind, and prevents their real appreciation of medical progress. His methods are much too common. He applies his various tricks in trade, his unnecessary fire-works, his private clinics to the family circle of the unfortunate patient, his sneers and jibes regarding methods of his neighbours in the profession, and all for the advancement of his personal prestige.

Let the rank and file of our profession stand by and use every possible effort to crush out of existence for all time, any educational programme which has for its sole object the creation of such as these. We can eliminate many of such by a prolonged supplementary course of training which should be sufficiently long to moderate their present exuberance and add wisdom to knowledge.

In making plans for the extension and perfection of our plan of organization, we must not forget those who are still students at our Universities. In our activities during the last two or three years, we have found it difficult to interest certain members of our profession who are well advanced in years. On the other hand the younger members of our progession have responded almost unanimously. We should extend our propaganda for organization to students, particularly those in the graduating classes. They should have some practical initiation into the problems of organization, and the duty that they owe, not only to themselves, but to the public at large, in maintaining our standards and ideals; and should understand their obligations as they go out into practice, to observe as rigidly as possible our principles of ethics.

A visit to the offices of the American Medical Association in Chicago would be full of interest and would prove to you what it has been possible to accomplish with perfection of organization and plenty of money.

They not only publish the Journal, but through various councils or committees carry on an intensive study of the many problems which are confronting them. The exposure of the fake remedies, the quacks and irregulars would fully justify our attempting to copy their huge machine. The public must be protected from those evils by a sane and effective educational propaganda, continuously supplied.

We must be prepared to extend the activities of our machinery of organization and the development of our central office. A much larger whole time staff must be engaged. The profession, either as individuals or acting through their organized units, must be prepared to subscribe liberally towards the funds which will be necessary. These matters are urgent and must receive our immediate attention.

Is it possible that any will refuse to play his part in the development of a policy which will further the advancements of medical knowledge, protect the public at large by prevention, and guarantee a complete medical service to all members of the community?

If we must appeal to ourselves on selfish grounds, let us remember the members of our own families not only as they are to-day, but as they may be, when we are gone, the men and women of the future with their families. Is this organization and educational propaganda not in their interests?

Uniformity is not essential for unity, but we can with efficient organization, assist in the fulfillment of our objects, and by co-operation and education more certainly guarantee the opportunity, rights and privileges of all of our individual members.

CARDIAC IRREGULARITIES

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In presenting this paper, an endeavour has been made to summarize the present day views of the important cardiac irregularities with a review and emphasis of the salient points in the differentiation and diagnosis of the various types.

The subject of cardiac irregularities and the diagnosis is an extensive one, the sites of origin and the various forms of irregularity and their causation being numerous and the exact diagnosis not always simple.

Irregularity in the heart's action is a frequent occurrence, readily recognized as such by the examining physician, and very often noted as being present by the patient. The irregularity may be a warning of mischief done, and of grave significance. Even more frequently, however, the irregularity is of no serious import. It is not so many years since the very presence of an irregularity in the heart's action served as an indication for all manner of restrictions being placed on the patient, and this very often without consideration of the nature and origin of the irregularity. It is therefore of importance that we should have a working knowledge of the various types of cardiac arrythmias, and of their significance and prognosis.

The studies of clinicians and physiologists of recent years have advanced our knowledge greatly in this field, and irregularities of types which were formerly mysteries are now clearly demonstrable.

In the analysis of disordered mechanism of the heart's action three mechanical methods are open to use:

First. Arterial Pulse Curves—the radial or brachial arteries being the ones usually chosen. These curves, while simply carried out, give fairly accurate indications of the character of any irregularity which may be present, and need only confirmation by one of the more elaborate methods.

Second. Venous Curves—taken by means of

the polygraph. These give us, in addition to the information obtained from arterial curves, the valuable, and often essential, information regarding the action of the auricle.

Third. Electrocardiographic Curves—which provide by far the most accurate information, and in some instances are indispensable to the making of an absolute diagnosis.

The normal starting place of the heart's contraction lies in the small node of tissue situated at the mouth of the superior vena cava,—the sino-auricular node. This is normally the most readily excited portion of the auricular musculature. It must be remembered, however, that if any other point becomes for some reason more excitable than the sino-auricular node, then the contraction will have its origin in this abnormal focus. Defects may thus arise in stimulus production, or equally in one of the other heart muscle functions, and consequent disturbances in rate and rhythm may result which may lead to the onset of a degree of heart failure.

Of disturbances arising at the site of stimulus production, the most frequent is the sinus arrythmia, or respiratory arrythmia. In this irregularity the whole heart is affected. Aside from the irregularity, the venous and electrocardiographic curves are normal. The irregularity usually presents a cycle which is coincident with the phases of respiration, the heart's rate increasing with inspiration and decreasing on expiration. The condition is probably of vagus origin. The diagnosis may be made on the character of the irregularity, usually altering with respiration, and of which the patient is quite unconscious. An important point is that the patient's condition gives no evidence of cardiac failure.

Probably the simplest form of irregularity is that present with the so-termed intermittent pulse. In this group, the most frequent of occurrence is the premature ventricular contraction or extra-systole. When from any cause a ventricle is stimulated during its period of diastole it contracts, and if this stimulation comes before the allotted time of auricular stimulation a premature ventricular beat occurs. This contraction, arising from abnormal source below the level of the auricle, does not interfere with the dominant heart rhythm as initiated in the auricle; the auricle maintains its normal regular rhythm. Usually the normally placed auricular contraction falls almost simultaneously with the ventricular extra beat, and as an independent wave is lost to view in the mechanical records. The auricular contraction falling with the premature ventricular contraction, occurs in the so-called refractory period of the ventricle, and consequently produces no ventricular response. Following the early ventricular contraction there is a pause, and provided the abnormal stimulus is not repeated, the ventricle waits for the next auricular contraction, and contracts in response to the normal stimulus. This pause following the extra beat is characteristic of the condition, and is of such length, that together with the shorter than normal pause immediately preceding it, is just equal to two cycles of the normal rhythm. Clinically, the premature ventricular contraction may or may not be perceptible at the wrist, but it can always be heard on auscultation. Ventricular premature beats are of frequent occurrence, probably in the majority of instances the subject is not aware of them; when he is, he is conscious of one of two things, either of the long pause in the heart's action, when he may have a feeling of faintness, or he may be conscious of the more forceful contraction coming after the pause.

A second variety of premature beats arising within the ventricle belong to the class known as interpolated extra-systoles. Here the premature beat falls mid-way between two normally placed ventricular contractions. They differ from the type just described, chiefly in there being no compensatory pause following the early ventricular contraction. When the heart's rate is slow, it is possible for a ventricular stimulus arising in an abnormal focus to occur early enough to permit of the succeeding auricular contraction coming at a sufficiently late interval to give rise to a ventricular response correctly timed. Clinically these interpolated extra systoles will be evidenced only on auscultation as a heart beat placed mid-way, or nearly so, between two normally occurring heart beats. There is no evidence of the premature beat in the radial pulse curves which present an unbroken line.

Arterial records of ventricular extra-systoles will vary in accordance with the force of the extra beat and the volume of the ventricular output. The premature beat may occur so early in diastole that (as a result of a very short preceding period of rest) the ventricular contraction will be too weak, and the volume of contained blood within the ventricle too small, to raise the aortic valves. Under these circumstances the contraction is, of course, not shown in the arterial tracing, and we see only an intermission in length equal to two normal cycles. Extra-systoles falling later in diastole may be evident in the arterial tracing as small beats followed by a compensatory pause. The first beat recorded following the abnormal one will usually be larger than the normal, the reasons for this being, first, that the heart has had a longer period of rest and is consequently better equipped for a contraction; and, second, that the volume of blood contained within the ventricle is slightly in excess of the normal.

Venous curves show a continuous and regular sequence of A waves significant of auricular contractions, the ventricular irregularity being also clearly in evidence.

Electrocardiograms give most accurately the sequence of events occurring within the heart chambers; they also give us information regarding the area from which the extra-systole arises.

On auscultation ventricular extra-systoles are always accompanied by at least the first sound coincident with the closure of the mitral valves; but in those cases in which the extra-systole occurs early in diastole, and in the presence of interpolated extra-systoles, the second sound may be absent or much altered.

Extra-systoles may also have their origin at some point within the auricle. When a premature contraction takes place in the auricle it is always followed by a contraction of the ventricle. Clinically extra-stoles arising within the auricle may or may not be conspicuous, the pause following them is irregular, and almost never compensatory. Frequently accurate measurement is necessary to demonstrate their presence.

Arterial curves show the disturbance of the rhythm.

In venous curves a definite auricular wave is seen preceding a premature C wave.

Electrocardiographically the occurrence of auricular extra-systoles is readily demonstrated by the presence of an auricular contraction of abnormal type preceding a premature ventricular wave. Also by the electrocardiographic method the abnormal form of the wave indicating auricular contraction gives us additional information regarding the point in the auricle from which the abnormal wave originates.

Mention should be made of the fact that premature beats may occur at the junctional tissues between auricle and ventricle, but they are of rare occurrence, and aside from electrocardiographic means are difficult of diagnosis.

In the past it has frequently been held that extra-systoles are evidence of an over excitability of the cardiac muscle. To-day the best authorities agree that the presence of these extra beats arising spontaneously give no evidence of any significant cardiac disturbance.

Another type of intermission occurs when there is some obstruction in the conducting mechanism between auricle and ventricle, with the result that there is a blocked ventricular contraction. This brings us to the consideration of Heart Block. Normally, the contraction of the ventricle following the auricular contraction is dependent upon the integrity and efficiency of the auriculo-ventricular node. Further, it should be noted that the normal ventricular response is dependent not only on an intact A. V. node, but also on the properly conducting bundle and its divisions beyond the node, and where an abnormal condition occurs in any part of this system, we will find either blocked ventricular contractions, or some degree of abnormal ventricular response depending upon the site and extent of the pathological process.

Heart block in man arises in one of three ways:

1. Injury to the auriculo-ventricular node, or to the main stems of the conducting system below the node.

2. Through influence of the vagus. It is to be noted that this type is abolished by atropine; also vagal blocks are usually of short duration.

3. Through the action of poisons. In the therapeutic field this is chiefly seen with overdoses of digitalis.

Various degrees of block are recognized. The first to appear is usually the incomplete block. In this stage occasional auricular contractions meet with no ventricular response. Before the actual appearance of dropped beats there is, however, a stage which should be noted, in which the defect is slight. Here we may have only a delay in the conduction time from auricle to ventricle. The ventricle may respond to all auricle contractions, but only after an abnormal period of time. Then with the onset of a higher grade of block there comes the occasional failure of the ventricle to respond to an auricular contraction, and we have a dropped beat. This may be recognized clinically by a silent period. This pause is not as a rule equal to two normal cycles, because the condition is usually accompanied by a slight variation of response on the part of the ventricle both in the cycles preceding and following the dropped beat, this being such that the silent period is less than two normal cycles.

With a progressive lesion the occurrence of Dropped beats becomes more frequent, and a regular sequence of failures in ventricular contraction appears. It is then that a fixed ratio between auricular and ventricular contractions becomes established and we have a resulting 2 : 1, or more rarely a 3 : 1 or 4 : 1 heart block; *i.e.*, there is response on the part of the ventricle to only every second, third or fourth auricular contraction.

A still more advanced grade of block is initiated when the ventricle fails to respond to any of the auricular impulses, and there is complete dissociation between the two portions of the heart. Here the stimulus for the auricular contraction arises in the normal pace maker, and the auricle responds normally to this stimulus and contracts at its normal rate of 76, or thereabouts, to the minute. The stimulus for the ventricle, however, arises from a point within the ventricle itself. The rate of the ventricle under these circumstances is slow, approximately 30 to the minute, and the rhythm is regular. Regarding diagnosis: Of primary importance on auscultation, is the reduced ventricular rate. On careful auscultation the auricular sounds are frequently audible during the silent periods of the ventricle. Also in complete block when an auricular systole falls with a ventricular systole there may be an intensification of the sound. If there should be an accompanying mitral stenosis, a murmur may be audible on the occurrence of those auricular systoles which fall during the silent period of the ventricle. On inspection, a pulsation in the vessels of the neck corresponding to auricular systole is often visible.

Mechanically, the presence of heart block may be demonstrated by any method displaying auricular and ventricular activity; most satisfactory by the electrocardiograph.

Another source of dropped beats is found in sino-auricular block. In this, the defect occurs at the normal source of stimulus production, where apparently a failure in the initiation of the impulse occurs. This type differs from the auriculo-ventricular block in that the missed beats include both the auricle and ventricle. The condition is not of major importance. For absolute diagnosis one of the methods displaying both auricular and ventricular action is necessary.

In the types of irregularity thus far considered, there has been with all a dominant controlled rhythm. This latter may be demonstrated, when throughout a heart tracing, there are runs of successive regularly placed beats. This is of importance in differentiating irregularities of the ventricle from one such as fibrillation of the auricles.

In fibrillation of the auricles we pass to the completely irregular pulse, in which the intervals between the beats are of varying lengths and where there are no phases of irregularity falling into any system. The clinical condition is characterized by a completely irregular ventricular action, and by a complete absence of any normal auricular contraction. It is the condition which is the most frequent cause of persistent irregularities found in the heart's action. It is frequently associated with mitral stenosis.

The pulse rate may be slow or fast, the usual rate being about 120. The force of successive beats varies in a marked degree. It should be noted, that in the presence of auricular fibrillation the radial pulse is a poor index of the actual heart rate, as it frequently happens that many of the ventricular contractions are abortive, and fail to produce a pulsation in the radial artery; this gives the so-called pulse deficit. The only reliable method of ascertaining the heart's rate is by auscultation over the precordium.

In arterial curves the condition is recognizable, first, by the absolute irregularity of the spacing, it seldom being found that any two successive beats show an equal pause between them. Second, there is a lack of uniformity in the force of successive beats.

In venous or electrocardiogaphic curves, the most striking feature is the complete absence of any evidence of auricular activity.

In the course of treatment with digitalis, the typically irregular ventricle of fibrillation may become almost, or occasionally quite regular. This does not mean cessation of the fibrillation, but it does demonstrate the production of a high degree of heart block.

Fibrillation may be accompanied by extra-systoles of ventricular origin. The presence of ventricular extra-systoles, alternating with ventricular contractions of the normal type, is a characteristic, and not infrequent form of irregularity seen accompanying over-dosage with digitalis.

There are two important abnormal rhythms which, while not so frequently seen, are nevertheless worthy of note. The first of these is paroxysmal tachycardia. Sudden increases in the heart rate, having their origin in the normal pacemaker, may be physiological, *e.g.*, in nervous individuals, under stimulus of some excitement, these attacks may be accompanied by the sensation of palpitation. Again, disturbances of a like character are found in certain pathological conditions, as exophthalmic goitre.

In addition to these forms, there remain a large group of tachycardias for which there is no etiological basis, where, for varying periods the normal heart rhythm disappears, and the heart responds to stimuli arising at a rapid rate from some new source. The onset is abrupt, as also is the termination of the attacks. The paroxysms may arise in the auricle, in the region of the auriculo-ventricular node, or in the ventricle. Their origin may frequently be determined by venous curves, or more precisely electrocardiographically.

Paroxysmal tachycardia arising in the ventricle is much less frequent than tachycardia of auricular origin. The attacks are usually of short duration, while the auricular variety may continue for hours or even days. The ventricular type is more difficult to diagnose than those of auricular origin. Electrocardiograms are practically essential in establishing the site from which the new rhythm arises.

A condition closely allied to the abnormality just described as auricular tachycardia, is the one known as auricular flutter. Lewis considers the possibility of the difference between the two being one of degree only. He classifies auricular flutter as those cases of abnormal rhythm which present an auricular rate surpassing 200 per minute, and in occasional instances ataining a rate of 350 per minute.

The auricular rate in flutter is extremely regular. With regard to the ventricle, it is in exceptional instances and then only for short periods of time, that the ventricle assumes a rate equal to that of the auricle. The usual condition is that of a two to one heart block, or even greater, a four to one not being uncommon. As a rule the greater the rate of the auricle the slower is the ventricular rate. It should be noted that the action of the ventricle may or may not be regular. The clinical diagnosis must be made on the usually extremely rapid heart rate. Venous and electrocardiographic curves show a regular sequence of auricular waves exceeding 200 per minute and a ventricular rate and rhythm which may be variable.

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EPIDERMOPHYTON INFECTION

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EPIDERMOPHYTON infection gives rise to a special type of ringworm. It attacks moist opposing surfaces, especially the inguinal region. It may be limited to the inner surface of the thighs and the folds of the groin or it may affect the genital organs. It is often seen in the axillæ, in the umbilical fold or beneath the breasts in stout women. It is not uncommon about the feet, especially between the toes and on the soles.

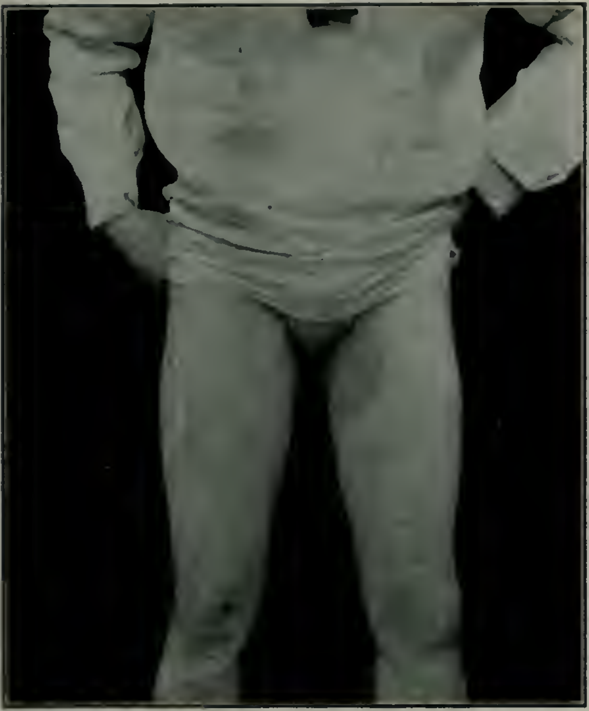
Since the war, amputation cases have been seen in which the ringworm spreads about the margin of the amputation sock following the primary infection of the inguinal region.

Certain clinical characteristics serve to distinguish it from ordinary ringworm of the body. It begins as slightly raised, rounded papules which, owing to the moisture of the part, instead of being scaly, are liable to present a raw sodden surface. The papules spread peripherally, the border becoming raised and well defined. Occasionally the patches clear up in the centre forming circinate lesions.

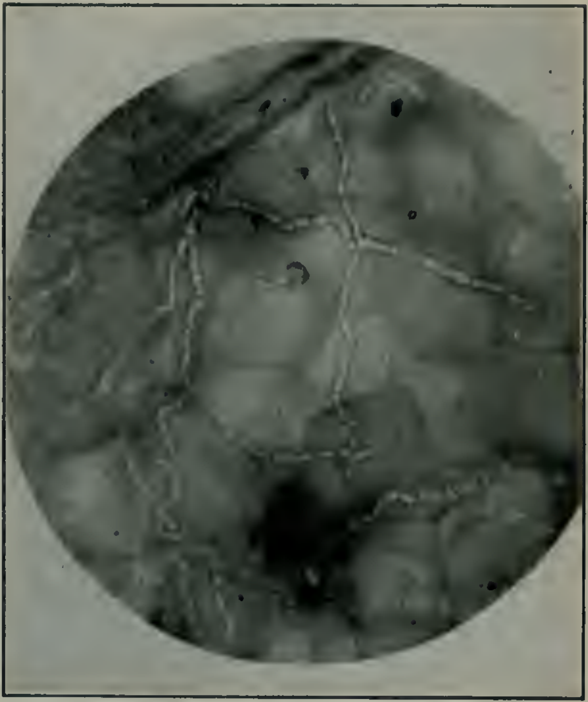
On account of the warmth and moisture of the region involved, the fungus grows rapidly and gives rise to considerable irritation. This is again aggravated by the friction of the clothes. The lesions, due to scratching, may become secondarily infected with cocci. The affection has a tendency to improve in the cold season, but it usually reappears with the return of the warm weather.

The manner in which it is contracted is uncertain. It may be transmitted directly by contact, from wearing infected clothes, or the use of water-closet seats, etc.

The special characteristics, when affecting the toes are congestion, fissuring and white macerated sodden appearance of the skin, especially between the toes. On the soles, as a rule, it presents irregular, scaly, sharply defined patches with little hyperæmia and occasionally vesicles can be noticed.



In a large percentage of cases, if not previously treated, the fungus can be demonstrated. Probably the simplest method is to take a scraping of the border, place the scales on a glass slide, add a few drops of potassium hydrate (10 per cent.) and cover with a cover slip. Allow the solution to act for a few minutes and examine under the high power lens. Branched mycelial threads are seen running between the epithelial cells and extending across the whole field. It resembles a chain of white, oval beads.



The treatment to be followed depends upon the clinical features of the case. In one with marked inflammatory reaction, a mild, soothing, antiseptic ointment is indicated; occasionally, during the day, a lotion such as lotio calaminæ with a little boracic acid, gives great relief, and the ointment can be applied at night, after the inflammation has subsided, or in a case with very little inflammation, an ointment containing acid salicylic, 1 per cent.; acid benzoic, $1\frac{1}{2}$ per cent. to the ounce of vaseline is most useful. To eradicate the condition, the acid salicylic and the acid benzoic have to be gradually increased in strength. Other ointments containing mercury or iodine are often efficacious. The underwear should be sterilized frequently.

THE USE OF LIVING SUTURES IN OPERATIVE SURGERY*

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Toronto

SOME years ago, during the course of an experimental and clinical study of the conversion of the tendons of paralyzed muscles into ligaments, we made the observation that no matter how freely the tendons were deprived of their blood-supply, they continued to live, and when examined months and years afterwards, presented the same glistening white appearance and the same histological characteristics as normal tendon.† This observation suggested the possibility of using free transplants of tendon or fascia in operations in which it is intended to fasten together structures which naturally tend to separate. A review of the literature at once showed that the autogenous transplantation of tendon and fascia had frequently been employed clinically and that it had also been carefully studied in the laboratory. We were particularly struck with the experimental and clinical work reported by Dean Lewis of Chicago. Lewis showed conclusively that the tendinous fasciæ could be transplanted to another position in the same animal with the reasonable certainty that they would continue to live and retain their normal gross and histological characteristics. He applied the principle thus demonstrated by experiment to the filling in of gaps in tendons produced by lacerated wounds and burns, and to the making of fascial sheaths to protect the point of suture of severed nerves from the ingrowth of ordinary scar. With this knowledge as a starting point we commenced a series of experiments on animals and a study of the clinical material which came under our observation, which has extended over a period of eight years, and we feel that sufficient time has now elapsed to justify a preliminary report of our studies.

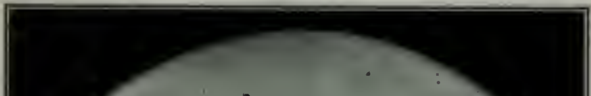

Fig. 1. Normal fascia and aponeurosis from rabbit's back, showing arrangement of fibres and cells. (High power.) 1. Vascular areolar tissue on surface. 2. Deep fascia of back. 3. Aponeurosis. 4. Muscle.

If a strip of fascia is examined under the microscope, it will be seen to consist of a mass of very thick parallel fibres which run a straight or slightly wavy course (Fig. 1). Between these fibres are scattered a small number of connective tissue corpuscles (tendon-cells). The fibres are gathered into bundles which are separated by a small amount of areolar tissue. In this areolar tissue run a very few blood-vessels and many lymphatics which pass into the fascia from a layer of similar tissue on the surfaces. The nutrition of the fibres and cells is evidently maintained by the free percolation of lymph through the tissue spaces. The aponeuroses and the tendons are practically the same as fascia except that the former are adherent to muscle on one side and the latter are in the form of stout cords instead of flat sheets. In tendon the trabeculæ of areolar tissue are more

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Read vefore the Academy of Medicine, Toronto,, March 1921.

* The research involved in this paper has been carried out in the laboratories of the University of Toronto, with the assistance of the funds at the disposal of the Medical Research Committee.

† "Tendon Fixation," etc. *Annals of Surgery*, March, 1913; *Journal American Orthopedic Association*, January, 1916.

pronounced and carry somewhat larger blood vessels. The parallel arrangement of heavy fibres in fascia and tendon gives these tissues great strength in one direction, that is, in the direction in which they are normally subjected to strain. In this respect they differ from scar-tissue, in which the fibres, although of considerable size, are arranged irregularly.

Our first experiments were practically a repetition of those described by Lewis. The animals used were rabbits and the operations consisted of the excision of patches of fascia which were immediately sewn back in place with black silk thread. The specimens were recovered at intervals ranging from a few days to many weeks.

During the first few weeks the specimens showed the ordinary phenomena of inflammation (Fig. 2). At first the blood-vessels in the tissues surrounding the transplants were much engorged and the whole area was covered with a plastic exudate. Very soon a thin transparent film developed over the transplant, consisting of capillary blood-vessels and fibroblasts. This film rapidly increased in thickness, and, by the end of the third week, consisted of a mass of spindle-shaped cells and fibres. The blood-vessels in this film increased in size at a corresponding rate until they could be seen with the naked eye, running across the line of suture and on the surface of the patch of fascia. During this time the transplant remained alive and showed on microscopic examination very little change beyond a moderate œdema. Its outline remained distinct, without any evidence of invasion by new blood-vessels or connective tissue, and without any leucocytic infiltration. The fibres and cells continued to stain well.

After the third week the inflammatory phenomena gradually subsided. The hyperæmia and œdema slowly disappeared and the film on the surfaces of the transplant became as thin and transparent as the layer of areolar tissue on the surface of normal fascia. In specimens recovered as late as a year after the operation there was nothing to indicate that the cells or fibres had been changed in any way or that their physiological value had been influenced by the transplantation (Fig. 3).

In a second series of experiments similar to those described we made a study of the transplantation of the aponeuroses of muscle. These aponeurotic transplants behaved exactly as did the pieces of deep fascia. The cells and fibres continued to live, and underwent no change further than that produced by the primary inflammatory œdema. No absorbtion, invasion or infiltration occured and there was no evidence of proliferation on the part of the cells. After the fourth week the transplanted tissue could not be distinguished from normal aponeurosis.

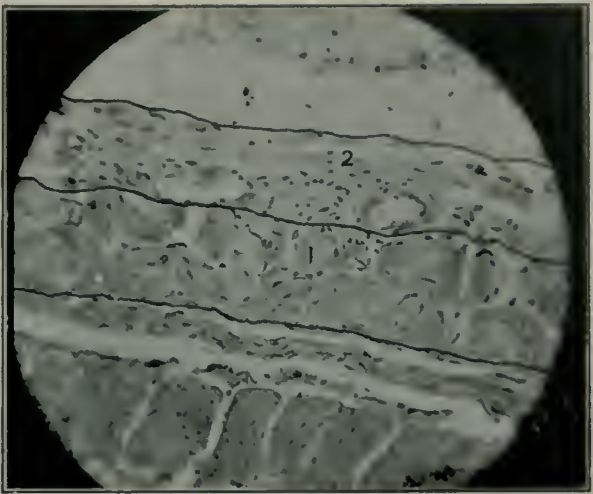

Fig. 2. Fascial transplant after three weeks. (High power.) 1. Fascial transplant. 2. Thick film of very vascular areolar tissue on surface.

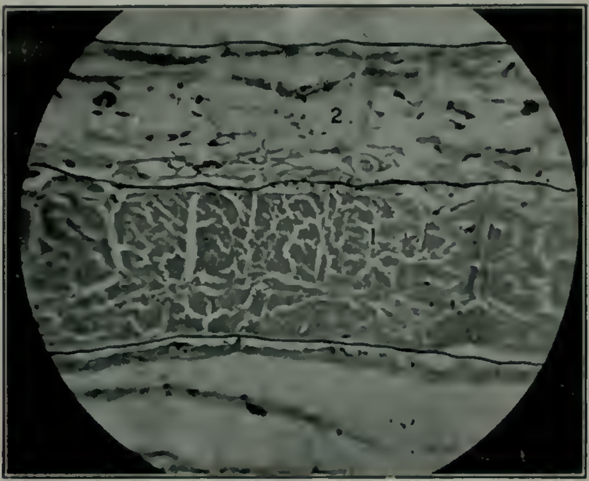

Fig. 3. Fascial Transplant after thirteen months. (High power.) 1. Fascial transplant. 2. Areolar tissue on surface with normal blood supply.

In a third series of experiments our attention was directed to the transplantation of tendon. Sections of the rabbit's tendo Achillis, or one of its component parts, were cut entirely free from the circulation and then sutured back in place with black silk thread. The specimens were recovered at varying intervals up to thirteen months. The results of these experiments showed that tendon behaves exactly as do fascia and aponeurosis. If the transplanted tendon is thick

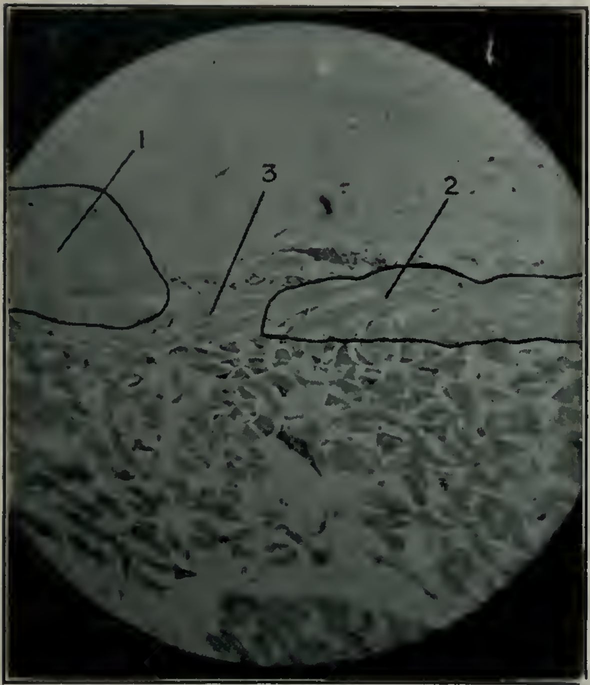

Fig. 4. Line of union between aponeurotic transplant and normal aponeurosis after thirteen months. (High power.) 1. Aponeurotic transplant. 2. Normal aponeurosis. 3. New tissue uniting the two.

however, the central portions undergo degeneration owing to the absence of an adequate supply of lymph. This observation indicates that if it ia necessary to use thick transplants of tendon they must be split longitudinally into several strands or, at any rate, freely incised, in order that lymph may be allowed to permeate to the deeper parts.

In all three series of experiments an observation was made which is of the utmost clinical importance. It has been pointed out that neither in fascia, aponeurosis nor tendon is there any evidence of proliferation of the essential cells of the tissue. When healing occurs, therefore, the connective tissue which forms at the point of union arises from cells which are not tendon-cells, and which cannot be expected to produce true tendinous tissue. In point of fact, they produce an ordinary scar (Fig. 4). Scar-tissue differs from fascia and tendon in that, although it is composed of quite similar white fibres, these fibres are very irregularly and loosely arranged and when subjected to continuous strain show a constant tendency to stretch. In many of our experiments this defect in the "patch transplant" method was clearly demonstrated. In these it was found that, whereas at the time of the operation the patch was accurately stitched in place with silk or catgut, when the specimen was recovered, weeks or months afterwards, the sutures had cut out or absorbed and the cut edges of the fascia or aponeurosis had separated widely owing to stretching of the scar or areolar tissue which constituted the line of union (Fig 5). This defect was even more noticeable in the operations on tendons. Herein lies the explanation, therefore, of the failure of many of the attempts which have been made to cure large hernias by the use of patch transplants and to bridge gaps in damaged tendons by end-to-end suture of transplants of tendon or fascia.

As a result of these observations it became evident that before the transplantation of tendinous tissues could become of real clinical value, some method must be discovered of securing a firm union of the transplant to the surrounding structures. With this object in view we did a series of experiments in which a piece of fascia a quarter of an inch wide and two inches long was removed from the animal's back and then placed

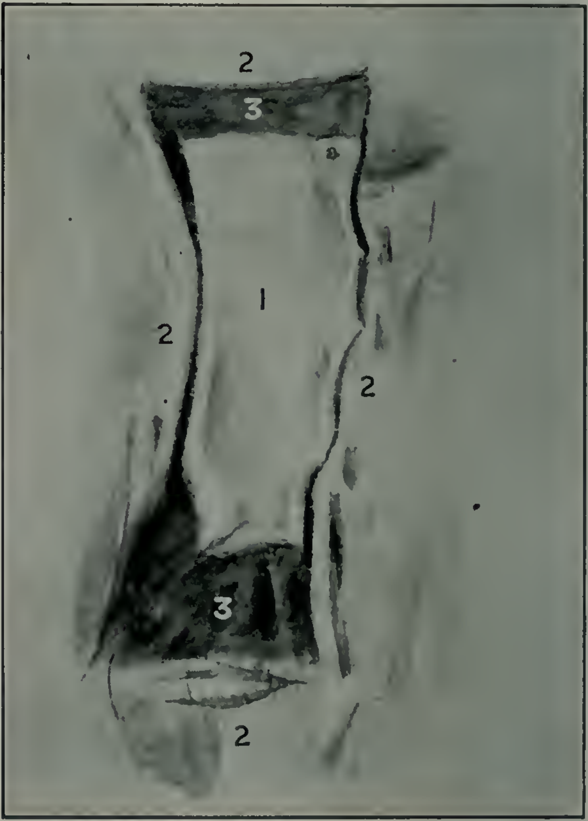

Fig. 5. Drawing of "patch" transplant of aponeurosis after thirteen months. 1. Aponeurotic transplant. 2. Edge of normal aponeurosis. 3. Thin film of new tissue uniting the two. At the operation, the transplant was accurately sutured all around its edge to the normal aponeurosis. Union has taken place by the formation of areolar tissue, which has stretched considerably.

transversely across the middle of the gap and woven two or three times into its edges (Fig. 6). The transplant was fastened in place by catgut sutures inserted at the points where it passed through the deep fascia. When the operation was completed the edges of the fascia were still a quarter of an inch apart and held in this position by the transplant which crossed the gap. These experiments were also repeated with the substitution of free transplants of aponeurosis and tendon for the fascia. This investigation showed that the solidity of the union of the transplanted fascia to the edges of the gap depended on the extent to which the former was woven into the latter. If the transplant passed only once or twice through the fascial margins, it usually failed to prevent the edges of the gap from stretching apart. If it were well woven into the edges, however, no separation occurred. The strength of the union also depended on the care with which the portion of the fascia used in the weaving was cleared of areolar tissue. Actual scraping and scarification of this part of the transplant produced the best results. Examination of the points of contact of the transplant and the surrounding fascia showed that the union occurred by means of new-formed connective tissue which ranged from the loose texture of areolar tissue to the firmness of ordinary scar. It is evident, therefore, that in order that the union may be strong enough to stand the normal physiological strain the transplant must be in actual contact with its bed over a considerable distance. This observation has proven of the greatest clinical importance and has resulted in the development of a special operative technique to which we attributed the success of most of our operations.

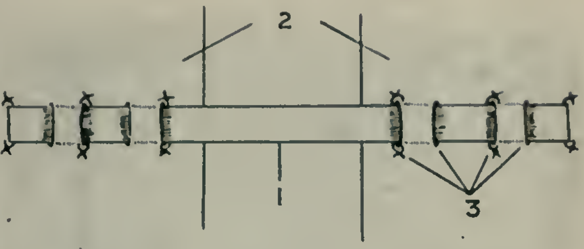

Fig. 6. Diagram showing method of fixation of "strip" transplant by weaving through slits in the fascia on either side of the gap. 1. "Strip" transplant. 2. Edges of gap in fascia. 3. Slits through which strip is woven and fixed by sutures.

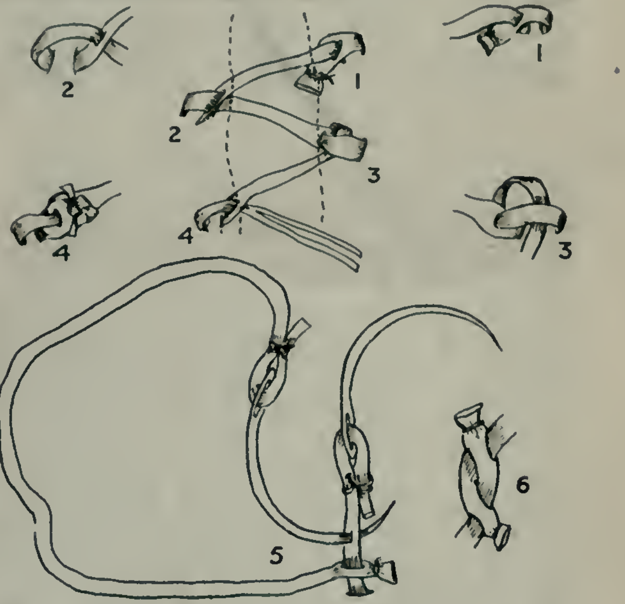

Fig. 7. Diagram showing method of inserting fascial suture. 1. Anchoring suture at commencement by looping it through itself. 2. Fixation of suture at each loop by passing it through itself. 3. Fixation by passing suture through itself and tieing in knot. 4. Ending of suture by passing through itself, splitting, and tieing ends in knot. 5. Method of joining new suture to one that has been inserted. 6. Join completed.

In many operations, however, such as the repairing of gaps in the fascia of the rabbit's back, the weaving of the transplant into the edges of the gap and anchoring it with catgut sutures is too laborious and uncertain a procedure to make it applicable to ordinary operative surgery. The search for a method of overcoming this difficulty finally led to the idea of using long strips of fascia and threading them on large-eyed needles, thus converting the transplants into living sutures. The idea was immediately tested experimentally and has proven to be the most valuable result of our research. In these experiments a strip of fascia, a quarter of an inch wide and six or seven inches long, was removed from the animal's back and threaded into a needle (Fig. 7). It was found necessary to tie the fascia into the needle as it is so slippery that it will otherwise constantly slide out of the eye. A catgut ligature was also tied about the terminal end of the fascial suture to prevent splitting. The needle was now passed through one of the edges of the fascial gap and then through the terminal end of the living suture and the suture drawn taut. The needle was again passed through the edge of the fascia and also through the fascial suture to make doubly sure that the anchor would hold. The needle was then carried across the gap in the fascia and passed through the edge of the opposite side. When the suture had been drawn taut the needle was either passed through the suture and again through the

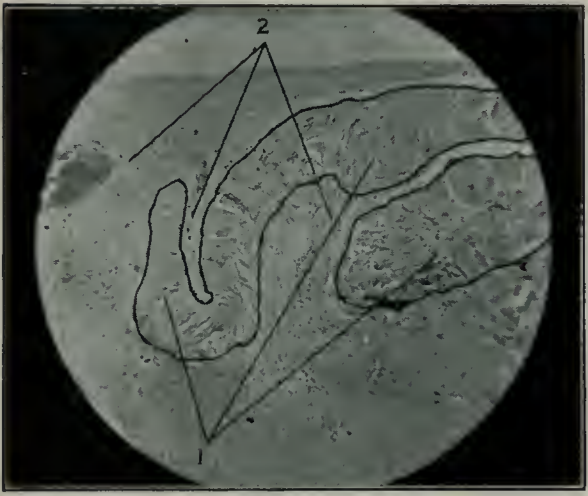

Fig. 8. Cross-section of portion of fascial suture after three weeks. (Low power.) 1. Folds of fascia. 2. New-formed vascular tissue surrounding whole suture and extending into spaces between fascial folds.

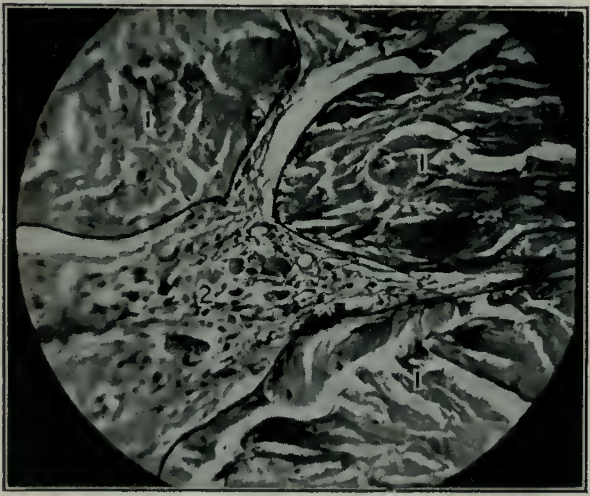

Fig. 9. Same as fig. 8., but under high power. 1. Folds of fascia. 2. New tissue between folds. The cells of the fascia are staining well, the outline of each fold is distinct, and there is no invasion of the fascia itself by the new tissue.

edge of the gap, or was passed through the edge of the gap and then looped so as to anchor the suture by a knot in itself. These details were found important as the fascial suture shows a marked tendency to slide. The knot proved the most effective means of anchoring it. In this way the suture was passed backward and forward obliquely across the gap, leaving its edges a quarter of an inch apart, until nearly all the strip of fascia had been used up. The needle was then passed several times through the edge of the gap, transfixing the suture each time, after which it was removed and the terminal inch of the fascia split longitudinally. The tails thus formed were used to tie a triple knot which was finally securely fastened by transfixion with catgut. The edges of the gap were thus held together at a distance of a quarter of an inch from each other by what might be called a living filigree. The suture was practically completely exposed to view and every opportunity was afforded for study of the changes which might occur during the succeeding periods of time.

The specimens were recovered at intervals of one week up to a little over a year. They show that the fascial sutures behave in practically the same way as the transplants in the first series of experiments. There is the same early inflammatory dilatation of the neighbouring blood-vessels and the formation of a film of exudate over the whole operative field. Soon minute blood-vessels can be seen spreading through this film on the surface of the suture. As the suture presents a folded appearance on cross-section, the film of exudate, which later becomes areolar tissue, extends into the spaces between the folds of fascia, bringing blood-vessels intocontact with all its surfaces (Figs. 8 and 9). During the first three weeks the suture is appreciably swollen, owing to œdema, but during the succeeding weeks this œdema disappears and the new-formed connective tissue shrinks into a delicate layer of vascular membrane. By the end of the sixth week the transplant has become a narrow rounded cord, closely resembling normal tendon (Figs. 10, 11 and 12). On cross-section its original folded appearance has disappeared and it is seen to consist of bundles of strong white fibres and tendon-cells separated by trabeculæ of areolar tissue which carry the blood-vessels from the surfaces. In all the specimens examined the fibres and cells have remained unchanged and, beyond the transient œdema of the first three weeks, show no evidence of inflammatory reaction. The specimens recovered at the end of a year are practically the same as those recovered at the end of six weeks (Fig. 13).

These experiments conclusively demonstrated the clinical value of the principle of the use of living sutures. The edges of the gap in the fascia were solidly held together as at the time of the operation. The suture had healed to the edges at all the points of transfixion and the loop and knots had become reduced to small nodules of fibrous tissue. At no point had the suture cut

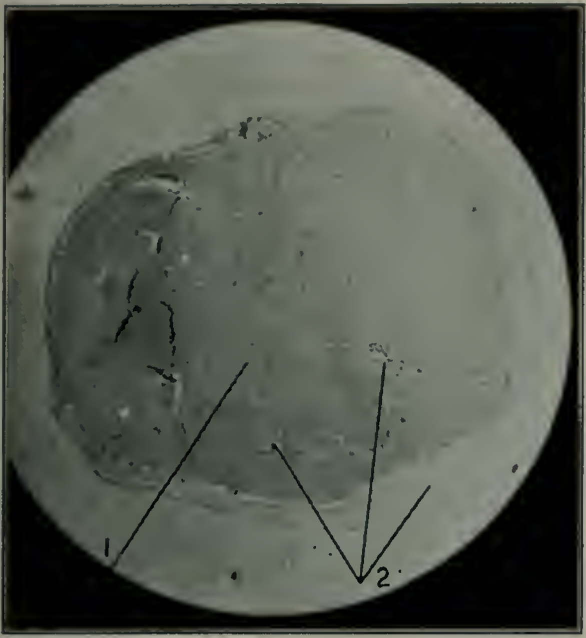

Fig. 10. Cross-section of fascial suture after six weeks. (Low power.) The suture is now a rounded cord. The separate folds can no longer be distinguished, and the new tissue between them is represented merely by narrow trabeculae of connective tissue. 1. Rounded cord of fascia. 2. Vascular areolar tissue.

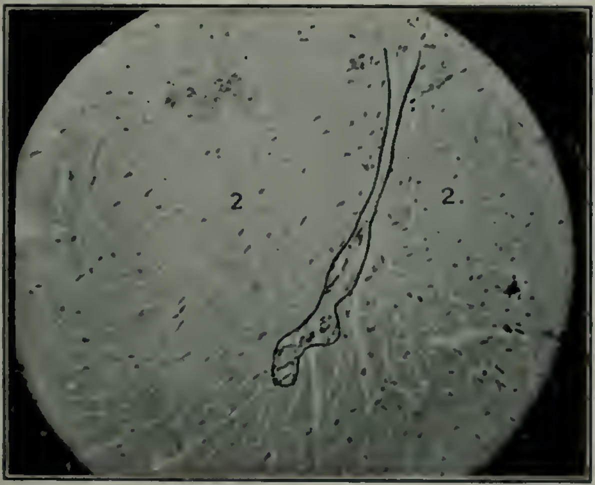

Fig. 11. Same as fig. 10, but under high power. 1. Connective tissue between folds of fascia. 2. Fascia, which is obviously living, and resembles normal fascia in every way.

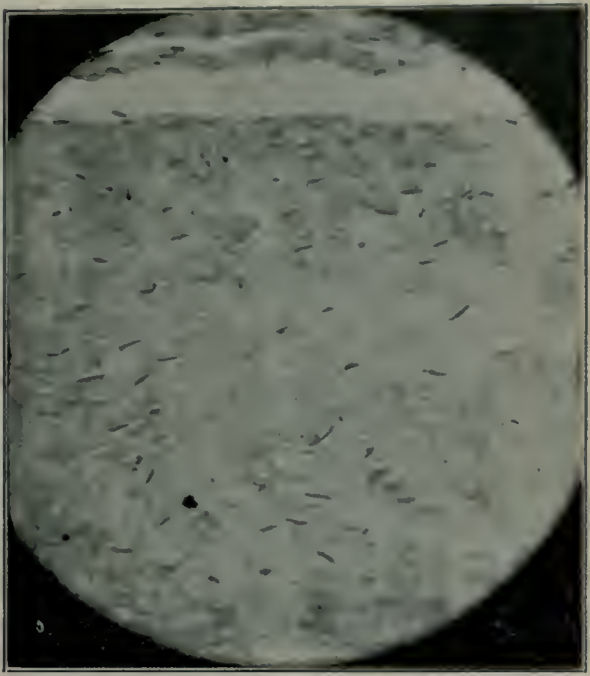

Fig. 12. Longitudinal section of fascial suture after six weeks, showing the persistance of the normal parallel arrangement of fibres. (High power.)

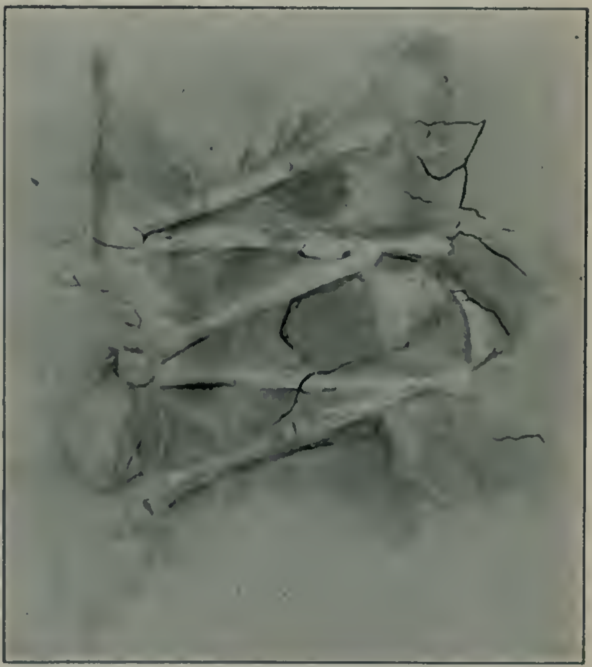

Fig. 13. Fascial suture at end of thirteen weeks, showing method of insertion. The suture is now a rounded glistening cord, resembling tendon in gross appearance.

out or become loosened, nor was there any evidence of stretching or contracture of the suture itself. This latter observation was amply proven in a series of experiments in which black silk markers were tied on the suture at accurately measured intervals. When the specimens were recovered these markers were always at practically the same distance from one another. Further, in no case had rupture of the suture occurred. Even in rabbits the strips of fascia are very strong, stronger than ordinary number two catgut, and strips of human fascia lata, which is the material we have used in surgical operations, are stronger than the stoutest kangaroo tendon. Destruction of the normal blood-supply and transplantation to another position in the body appears to have no effect on the strength of the suture. This was demonstrated by testing the tensile strength of specimens in a special machine after recovery at various intervals.

The results of this experimental study of the transplantation of the various fibrous tissues may be summarized as follows:

1. When a piece of fascia, aponeurosis or tendon is cut free from its circulation, and transplanted into such a position in the same animal that it can receive an adequate supply of lymph, it will continue to live, and, for all practical purposes, will continue to live unchanged.

2. During the first few weeks following the operation, an inflammatory reaction occurs in the tissues surrounding the transplant which results in its complete investment in a vascular areolar membrane and in its healing to those tissues with which it comes into immediate contact.

3. Such transplants heal to surrounding structures by means of new-formed connective tissue and it is upon the strength of this connective tissue that the firmness of the fixation of the transplants depends. If the operation is performed without the complete removal of the areolar tissue which normally ensheathes the transplant the union will have merely the strength of areolar tissue. If, on the other hand, the areolar membranes are completely removed and the transplant and the surrounding tissues placed in actual contact, the nature of the union will be in the form of a fibrous scar,' which materially increases its strength. As scar-tissue, however, is very apt to stretch under even moderate degrees of strain, it becomes essential to place the transplant in contact with the surrounding tissues over a considerable distance in order that the amount of scar-tissue in the line of union may be sufficiently strong to withstand any degree of physiological strain.

4. In many cases the mechanical difficulties in the way of placing the transplant in actual contact with the surrounding tissues over long distances are so great that the method just described becomes valueless in ordinary operative surgery. These difficulties, however, can be completely overcome by employing the fascia or tendon as a suture and by weaving it securely into the surrounding tissues. In this way the necessity for removing the areolar membranes from the surfaces is eliminated and one no longer depends upon the healing of the transplant to the surrounding tissues for the success of the operation. The strength of the bond of union will now depend on the strength of the transplant itself and of the structures into which it is woven. If the surgeon is careful to choose for his living suture a material which is known to have the necessary strength to withstand the anticipated strain, and if the suture is securely anchored into tissues which can also tolerate this strain, the permanent union of these tissues can be confidently expected.

The principles developed from this research are of great clinical importance. For a number of years it has been known that the fibrous tissues could be transplanted with the expectation that they would live, and many operations have been reported in which the principle has been employed. The method has never become popular, however, owing to the frequency with which the operations have failed as the result of stretching of the scar-tissue which forms the bond of union. A striking example of such failures is seen in the attempts which have been made to repair large ventral hernias with patches of fascia lata.` These patches were either cut to fit the opening in the abdominal wall or made to overlap its edges slightly, and fastened in place with catgut or linen sutures. The explanation of the failure of these operations to cure the hernias is simple when one considers the weak character of the healing at the edges of the transplant. To this insecure union, in fact, can be attributed most of the failures which have attended so many of the operations in which transplanted fibrous tissues has been used.

It is not our intention to describe in this paper the details of the variety of operations in which the principles evolved from this research have been employed. These will form the basis of future publications. We shall be content at present to indicate the various fields in which the method has been or may be used and to give a few examples which demonstrate its clinical value.

One of the most suitable fields for its employment is in the repair of injured ligaments or in the making of new ligaments for the prevention of paralytic deformities. An excellent example of the former was provided some months ago by a man of forty years of age who came to us with a history that a year previously he had fallen down stairs, striking his left knee against a radiator. The initial signs of trauma were very severe and the disability since that time such that he has been unable to carry on his trade as a bricklayer. This disability consisted of lack of power to extend the knee, with the resulting insecurity in walking and total inability to climb. Examination showed a complete rupture of the ligamentum patellæ. In this case we performed the following operation: The patella, the remains of the tendon and the anterior surface of the upper end of the tibia were exposed by an "S"-shaped incision. Two quarter inch holes were drilled obliquely through the patella, the first extending from the outer edge of the quadriceps tendon to the inner side of the ligamentum patellæ and the second from the inner edge of the quadriceps tendon to the outer side of the patellar ligament. The two holes thus crossed within the patella. A larger hole was then drilled perpendicularly into the tibia at the junction of the patellar tendon with the tubercle and two other holes which commenced an inch lower down on the internal and external surfaces made to meet the first hole in the depths of the bone. The tendo Achillis of the same side was then exposed and a segment about seven inches long and half its thickness removed. The whole of the plantaris tendon was also excised. The segment of the tendo Achillis was split longitudinally into two equal portions and thoroughly scraped on its superficial surface until all areolar tissue had been removed, and then carefully scarified. The remains of the ruptured ligamentum patellæ were split longitudinally, so as to expose the synovial membrane of the joint. The segments of tendo Achillis were then drawn taut and anchored by catgut sutures passed through their exposed extremities and the neighbouring periosteum. Between the lower end of the patella and the tubercle of the tibia the new ligaments lay on the synovial membrane and between the remains of the ruptured ligamentum patellæ. The plantaris tendon was now threaded on a large-eyed needle and anchored into the periosteum of the tibia as described in the experiments. It was then woven backwards and forwards through the new and old ligamenta patellæ until these formed a solid mass of tendinous tissue, and finally anchored into the patella. The result in this case, as you can see, is entirely satisfactory. The patient now has the full use of his knee and has been able to return to his ordinary occupation.

The technique described in this operation is illustrative of that employed in all the operations in which transplants have been united to bone. It will be observed that great pains have been taken to secure firm adhesion of bone to tendon. The transplants were split and scraped and scarified, and made to fit accurately into long holes in the bone. Years ago we discovered during our study of tendon fixation for infantile paralysis, that, unless these precautions were taken, a solid fixation rarely occurred. On several occasions we had an opportunity to examine into the cause of these failures at a second operation and we found that although the tendons had been laid in a tunnel or trough in the bone, a sufficient amount of areolar tissue had been retained on their surfaces to constitute a sheath and that they slipped in these sheaths sufficiently to produce a complete failure of the operation. In other cases the trough in the bone was so short that, in spite of the scarification of the tendon, the strain ultimately placed upon it was enough to stretch the scar-tissue by which it was united to the bone, and failure resulted. These clinical observations, supported by the experimental finding already described, have led us to lay down the rules that in all operations in which it is intended to unite transplants of the fibrous tissues to bone, the transplants must be laid in the bone for a considerable distance, they must fit the troughs or tunnels snugly, and the surfaces must be sufficiently cleaned and scarified to allow actual contact between the bone and the exposed fibres.

The method described has been applied to a variety of other conditions in which deformities have occurred in joints. For example, we have operated upon two patients suffering from recurring lateral dislocation of the patella. In these patients the patella was prevented from redislocation by free transplants of tendon or fascia passed through holes in the patella and the internal condyle of the femur. Both operations have been quite successful. We have also used the method in four cases of severe hallux valgus, with a view to preventing recurrence of the valgus deformity, which is apt to happen after the ordinary operative procedures. One of these has stood the test for eight years and the others, up to the present, are equally satisfactory. We have also used transplanted tendon and fascia to prevent the varus deformity which frequently follows astragalectomy for infantile paralysis, and as an assistant in arthrodesis of the mid-tarsal joint in small children. During the past two years we have been experimenting with the method in an attempt to prevent foot-drop in paralysis of the dorsiflexors. The operation has consisted in suspending the fore-part of the foot from the lower end of the tibia by means of transplanted tendon. Up to the present we can report two successful results.

The principle of the method has been applied in a somewhat different manner in recurring dislocation of the shoulder. This condition results from stretching of the scar which forms after the rupture of the ligaments. The ordinary plication of the capsule, or excision of the scar, with suture of the wound so produced, is notoriously uncertain for the simple reason that the success of the operation must depend on the formation of new scar or areolar tissue in the folds of the plication, or in the line of suture. By using a suture of fascia lata, however, one no longer depends upon new connective tissues to increase the strength of the capsule, but places his reliance on the suture itself. If this is woven backwards and forwards across the weak spot in the ligaments, the capsule can be restored to its former efficiency and a functional cure anticipated. The patient whom we are presenting to-night has stood the strain of an ordinary mechanic's occupation for a year and, as you see, has no disability.

The transplantation of the insertion of muscles has always been more or less of a failure owing to the difficulty of getting a stable union of the muscle fibres to the structures to which they are sutured. This is well exemplified in the attempts that have been made to transplant the insertion of the trapezius into the arm in paralysis of the deltoid. We recently did this operation with the modification that we wove fascial sutures into the trapezius muscle and carried them down to holes drilled in the humerus at the insertion of the deltoid. The result is a marked improvement over those obtained from the usual method.

From time to time we have been called upon to deal with patients who have suffered severe injury to the tendons of the forearm. In some of these it was found impossible to bring the severed ends together, owing to the contracture which had occurred in the muscles. In others in which it was possible to draw the ends of the tendon together with sutures, the success has only been partial owing to the ultimate stretching of the fibrous tissue at the point of union. The same can be said of the attempts that have been made to bridge gaps in tendons with pieces of fascia or tubes of fascia where the union of the fascia to the tendon depended on ordinary sutures. Since the introduction of the principle of living sutures these difficulties have been greatly reduced. In our early cases we wove the strips of fascia into the ends of the tendons, much as a sailor splices a rope, but with the addition of the idea of threading the fascial sutures on a needle the procedure has been greatly simplified. Gaps in severed tendons can now be easily bridged, with a certainty that stretching at the line of union cannot occur.

The principle has also been successfully employed in the treatment of congenital ptosis. About eight months ago Dr. W. W. Wright operated on such a patient, using fine living sutures made from fascia lata, and he succeeded in suspending the eyelid from the thick skin of the eye-brow which is moved by the occipito-fronta'is muscles, without further incision than that which resulted from the puncture of the needle. As you can see the result in this case is truly splendid, in that the ptosis has been overcome without any disfigurement whatever.

Other conditions to which the method is applicable need only passing mention in this paper. It needs no stretch of the imagination to see its possibilities in the treatment of the various types of visceroptosis, floating kidney, malpositions of the uterus and undescended testis. For ruptured and retracted muscles it provides a certain method of securing healing of the severed fibres or of bridging the gap if the ends cannot be approximated.

We have designedly left to the last the discussion of the surgical field in which the most of our clinical work has been done and upon which we feel that the results of our study will have the greatest influence. Hernia is a condition which frequently fails to respond to surgical treatment. The published records of all well-known clinics show that the number of recurrences after the operative treatment of large ventral hernias, direct inguinal hernias, and old oblique hernias in patients past middle age, is most unsatisfactorily high. This state of affairs, we have great hope, will be materially changed with the introduction of the principle of living sutures. We shall not enter here into the details of the operative treatment, as these will form the basis of another paper, but we shall rest content with a short review of the cases and their treatment, and a report of the results so far obtained. Up to date we have operated on thirty patients. A few of these were suffering from recently acquired direct inguinal hernia but the majority were cases of recurred direct or indirect inguinal hernia, or supposedly inoperable ventral hernia. There was one case of recent indirect inguinal hernia in a man suffering from a complete flaccid paralysis of the abdominal muscles. Beyond the removal of the sacs the treatment in these cases consisted of repairing the weak abdominal wall with living sutures of fascia lata. These sutures were about seven inches long and a quarter of an inch wide. They were threaded upon a curved large-eyed needle and woven into the edges of the surrounding muscles and aponeurosis much as one darns a sock. No attempt was made to drag the structures into which they were woven out of their normal positions, as is so frequently done in the ordinary operations, but simply sufficient tension employed to make the sutures lie flat. Thus the success of the operation depends not upon inducing such structures as the internal oblique muscle or the conjoined tendon to heal to Poupart's ligament, but solely upon the strength of the living suture and upon its firm grip of the surrounding tissues. One case serves to illustrate the value of the method. A soldier was admitted to hospital with a huge ventral hernia resulting from a shell wound which tore away the right upper portion of the abdominal wall, including most of the rectus muscle. When we saw him he had an hernial ring of oval shape which measured seven inches by four. All who saw him agreed that by ordinary methods one could not hope for a cure. Our operation consisted of the removal of the scar and sac, the exposure of the edges of the muscular and aponeurotic ring and the closure of the opening by layers of living sutures which were woven strongly into the surrounding structures and crossed each other as in the weaving of a basket. The result has been most gratifying. As you see the hernia is cured and the abdominal wall is as firm as could be desired.

These operations for hernia have now extended over a period of nearly two years and, up to the present, there has not been a single recurrence. One of the cases suppurated mildly, but after discharging pus for about four weeks healed up without extrusion of the sutures and has remained solid ever since. When one considers that these were all difficult cases, many of which had been operated upon once or twice previously, by first-class surgeons, the value of the principle of living sutures must be apparent. We believe that we have found a method which will reduce the percentage of recurrences to a negligible quantity and greatly widen the field in which operative interference will be of value.

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APOLOGIA

The readers of the July issue of our Journal may have viewed with some dismay the reduced size of that number, but we trust that they have not failed to observe the announcement that a printer's strike was the etiological factor. This is all the more pathetic in view of our promises made at the beginning of the year, that the enlarged Journal would in future afford much more satisfaction than in the past.

This defection on the part of the printers has likewise added, no doubt, to the disappointment of many contributors who have been naturally eager to see their papers appear promptly. We nevertheless take a special pride in announcing that in future the Journal will appear with at least sixteen more pages than in earlier numbers, as soon as the labouring class afford us the opportunity so to do. This, we trust, will enable us to give satisfaction to a larger number of contributors, will permit the earlier appearance of their papers, and will present to our subscribers a journal which will be much wider in its scope.

It is the intention of the Executive Board of the Journal, as soon as financial conditions permit, to carry out as active a propaganda as possible on behalf of the profession, and against the illegitimate practices which are already so prevalent in this country.

An endowment fund is now being established, which we trust will place the present Journal once more upon a satisfactory basis, and enable the re-organization scheme as outlined to be carried through with every hope of success.

We crave, therefore, the indulgence of our readers until such time as the situation among the printers can be so rectified as to permit us once more to resume our normal procedure with an enlarged programme to which every member of the Editorial Board is giving his earnest attention.

THE DIAGNOSIS OF CHRONIC CHOLECYSTITIS

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MATERIAL.—This paper is based on a study of the literature on the subject, and on the observation at operation of 53 cases of chronic cholecystitis. I regret that in only 20 of these cases were the records sufficiently complete to warrant their being reviewed.

Cholecystitis is a disease of the gall-bladder caused by bacterial invasin of its walls. (1) Whether the infection ascends from the duodenum, descends from the liver, or comes in the back door by way of the blood stream as suggested by Rosenow, is as yet undetermined. Infection having gained entrance to the tissues the usual changes of inflammation take place. So we have congestion, oedema and round celled infiltration, going on perhaps to necrosis of the mucous membrane or even gangrene of the walls of the organ. Swelling of the regional lymph glands occurs, and the inflammatory process may involve the liver and pancreas. The cells of the mucosa are stimulated and the resulting over-production of mucus greatly increases the viscidity of the bile. Due to the inflammatory swelling of its mucous lining and the increased viscidity of the bile, it becomes increasingly difficult for the gall-bladder to force its contents along the cystic duct. This process may continue until the cystic duct becomes occluded. The peritoneal coat of the organ becomes roughened and adhesions form between it and adjacent structures-intestine stomach, transverse colon or omentum. If the inflammation is chronic in character the normal blue color of the gall-bladder may be changed to pearl grey.

HISTORY.—The diagnosis of chronic cholecystitis is by no means always easy, and as yet must depend mainly on a well-taken history. There is good reason to believe that the role of typhoid fever as a causative agent in this disease has been greatly overestimated. In the 20 cases here reviewed, a history of previous infection with typhoid was obtained in only 2 cases. Focal infection, especially pyorrhoea, is a frequent concomitant of this disease. The frequency with which one meets with oral sepsis and suppuration in the accessory sinuses of the nose in cholecystitis, would seem to lend some support to the view that the infection is an ascending one from an infected duodenum. On the other hand it may be that the common infective agent in these conditions has also a special affinity for the tissues of the gall-bladder. A definite focus of infection was present in 12 of my cases when they presented themselves for examination. Regarding the nature of the infection: 3 had a chronic profuse discharge of pus from the nasal cavity, 2 had chronic pelvic infection, 1 had septic tonsils and 6 had well-marked pyorrhoea alveoearis. It is interesting to note that in the 8 cases in which no focus of infection could be found, 5 occurred in women who had borne children.

Attention has been called by Deaver and others to the frequency with which disease of the gall-bladder is accompanied by appendicitis. Oschner (2) found that more than 35 per cent. of his cases of cholecystitis were associated with either acute or chronic disease of the appendix. In 5 of my cases the appendix was removed at a previous operation and in 3 others the organ showed gross evidence of disease, either in the form of periappendiceal adhesions or stricture of the lumen.

SYMPTOMS.—Apart from the pain of biliary colic the symptoms of this disease are by no means violent in their nature. A vague feeling of epigastric distress with occasional attacks of vomiting, and the belching of gas may be the only indications in the

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Read before the Winnipeg Medical Society, February 18th, 1921.

history that the gall-bladder is the offending organ. Whipple (3) in an analysis of 400 cases of cholecystitis operated on at the Presbyterian Hospital, New York, found: "that aside from the typical character and radiation of the pain in biliary colic, the most constant symptoms of gall-bladder disease are those of 'indigestion', i.e., a feeling of epigastric distress or a distended or bloated feeling in the epigastrium or left upper quadrant, and the belching of gas." This group of symptoms occurred in 78 per cent. of the cases. The above train of dyspeptic symptoms comes on commonly after meals and the "distress" varies from a slight feeling of discomfort to well-marked pain. Qualitative food dyspepsia may be present, the gastro-intestinal tract showing a special intolerance for fats. Vomiting is a fairly constant symptom and was present in 14 of my cases. In one case in which a stone the size of a large cherry was impacted in the cystic duct, the patient had vomited after every full meal for two years. Only 2 cases gave a history that could be construed as biliary colic though stones were present in 11 cases. The most outstanding single symptom was the belching of gas.

PHYSICAL SIGNS.—The most constant and trustworthy sign of cholecystitis is tenderness in the region of the gall-bladder. This sign was present in all but one of my cases when examined for by the Murphy method.

While rigidity of the rectus muscle is more marked in the acute cases, a definite resistance, especially in the upper fibres of the muscle, can sometimes be made out. The presence of this resistance was recorded in 4 of my cases.

It is possible that liver enlargement as a sign of bile tract infection has not received the attention that it merits. Whipple in his case histories already referred to, states that: "a hepatitis, either in the form of a localized or contiguous inflammation about the gall-bladder and ducts, or a general involvement, a true bilary cirrhosis, was found on gross examination of the liver in 21 per cent. of the cases of cholecystitis." Graham (4) in 30 cases of bile tract infection observed at operation states that the liver was found to be enlarged in 87 per cent. of the cases. If liver enlargement is present in anything like the percentage reported by Graham in his cases, it is obvious that the size of the organ is an important diagnostic sign in infection of the biliary apparatus. Enlargement of the liver was recorded in the preoperative examination in 3 of my cases. It was, however, found distinctly enlarged in 5 cases at operation. The greatest enlargement was observed in a case complicated by a stone in the common duct causing obstruction. The liver in this case was a hand's breadth below the costal margin and showed a well marked Reidel's lobe.

Involvement of the pancreas occurs in 36 per cent of cases of cholecystitis, either as an induration of the whole organ or of the head. (5) In thin patients with pancreatic involvement the pancreas as sometimes be felt as a mass of woody consistency extending across the upper abdomen. Unfortunately many of these patients are fat and I have not been successful in obtaining much reliable information from a preoperative palpation of the organ. The pancreas was found indurated in 4 of my cases at operation.

LABORATORY FINDINGS.—Under this heading I will include the x-ray, stomach contents and the duodenal tube.

The percentage of gall stones that can be demonstrated by the x-ray varies greatly with different observers. The estimate of 20 per cent. is, in the hands of the average roentgenologist, probably entirely too high.

The size of the gall-bladder may also occasionally be demonstrated.

The most useful field of the x-ray, however, is in the detection of pericholecystic adhesions. This was done in 7 out of 11 cases in which adhesions of the gall-bladder to adjacent structures were found to be present at operation. In no case were stones or the size of the gall-bladder shown on the x-ray plate.

Attempts have been made by different observers to interpret the gastric acidity as evidence for or against gall-bladder disease. Moynihan (6) speaks of hyperchlorhydria as an accompaniment of gall stones. On the other hand Fravel (7) in examining the stomach contents in 61 cases of cholecystitis found an excess of HCE in but 5 cases, while 45 cases showed free HCE of less than 20. Holweg (8) states that hypochlorhydria is an important sign of cholecystitis, and that it is present in from 71 to 84 per cent. of cases. Bassler (9) divides his cases of cholecystitis into clinical types, some of which have an increase in the gastric acidity, while in others it is diminished or normal.

In my own cases the results were so variable that no definite conclusions could be drawn. Some of the cases with repeated examinations showed hypoacidity at some and hyperacidity at others. I think one is safe in stating that examination of the stomach contents as ordinarily conducted is useless as far as the diagnosis of cholecystitis is concerned. Further use of the fractional method may lead to something more definite.

Considerable prominence has recently been given to the use of the duodenal tube in the diagnosis and treatment of cholecystitis. Bassler in speaking of its use states that some of the most perfect samples of normal returns have come from cases in which operation proved the presence of markedly diseased gall-bladders, gall-stones and even obstruction, and that in the average gall-stone case it is quite useless. The possibilities of contamination are so great that conclusions drawn from a bacteriological examination of bile obtained with the duodenal tube seem valueless. Moreover,assuming that the bile has been obtained from the gall-bladder and that it is infected, we have by no means established a case of cholecystitis.

If we found infected material in the lumen of the appendix we would not accept the finding as proof of appendicitis; nor if we found infected urine in the urinary bladder would we be justified in making a diagnosis of cystitis. If infected material can exist in other mucous lined cavities without setting up inflammation, why not in the gall-bladder also?

The procedure is as yet too new to state definitely its value. It has possibilities and little more can be said about it.

DIAGNOSIS AT OPERATION.—In the great majority of cases of cholecystitis the condition is obvious on opening the abdomen. The presence of stones, a thick walled sclerotic gall-bladder, pericholecystic adhesions with perhaps some liver enlargement or induration of the pancreas leave no doubt in the mind of the operator. However, it is well recognized that disease may exist in a gall-bladder which, on external examination appears normal. In doubtful cases the regional lymph glands should be palpated. There are two or three glands along the course of the cystic duct and three or four along the hepatic and common ducts. Those along the common duct drain the duodenum and pancreas. In inflammation of the pancreas the bile tract is usually involved. Mayo (10) states that "given sufficient symptoms for surgical intervention, if these glands are swollen without other adequate cause, as from diseased duodenum, pancreas or general abdominal infection, the gall-bladder should be removed whether or not stones are present." Lilienthal (11) recommends aspiration of the gall-bladder with a hypodermic needle. If the aspirated bile is of a deep greenish color, with a great increase in the mucus, or if granules are present he states that the gall-bladder should be removed even if it appears normal. This test has the disadvantage that it is often impossible to get the sticky ropy bile that is so often present in cholecystitis to flow through the aspirating needle.

Regarding the treatment in these 20 cases, I simply wish to state that the gall-bladder was removed in every case. Appendectomy was also done in all cases in which the appendix had not been removed at a previous operation. There were no deaths in the series.

CONCLUSIONS.

1. The history and clinical findings still remain by far the most important factors in the diagnosis of cholecystitis.
2. The most outstanding single symptom of chronic cholecystitis is the belching of gas.
3. Tenderness in the region of the gall-bladder is the commonest and most trustworthy physical sign of cholecystitis.
4. In doubtful cases the physical examination of the liver and pancreas may be of assistance in making the diagnosis.
5. If at operation the gall-bladder appears normal, the regional lymph glands are not involved, and the aspirated bile does not on gross examination differ widely from the normal, operative interference is not justified even if the bile be shown to be infected.

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GENERALIZED NEUROFIBROMATOSIS

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THIS disease is not frequently seen in practice. The writer has a recollection of only two cases that have come under his observation. One was the cutaneous form in a middle-aged soldier in the service of Lt.-Col. J. G. Johnson, C.A.M.C., at Bramshott. The other was one of the nervous form in a young girl from the country in Manitoba. The latter was of such unusual interest that it is considered worthy of publication.

Anna S., a Polish girl, seventeen years of age, was admitted to my service in the Winnipeg General Hospital on July 23rd, 1920, having been brought in by her father from a farm in Manitoba.

Complaints on admission. "Poor eyesight and trembling fits at night." Duration five months.

Personal History. Patient was born in Poland seventeen years ago. Two or three years after her birth her parents noticed that her left arm was smaller and shorter than the right. She had been born in normal labour; forceps were not used. She was the second child of a family of seven. When she was a year old her parents emigrated to Canada. As she grew up her parents noticed an increasing disparity in the size of the right and left arms, that the left was weaker than the right, and that there was little or no prehensile power in the left hand. She gradually learned to lift and carry light articles from her left elbow which could be fairly firmly flexed. At eight years she began school and continued her studies for four years with apparently average progress. Four or five years ago her father took her to the Rochester Clinic to see if anything might be done for her arm. He was told that nothing could be done.

As to other illnesses, she suffered some indefinite injury to her right foot some five years ago. During the winter of 1919-20 she had a mild attack of Influenza. She has never menstruated.

Family History. Father and Mother are in good health. There are two sisters and three brothers, all younger than patient, who are apparently normal in all respects. The oldest child of the family died at the age of five years after six weeks' illness with chest trouble contracted en route to Canada. There is no history of any nervous diseases on either side of the family with the exception of a paternal aunt, who had left sided torticollis from birth. Patient's mother never had any miscarriages.

History of Present Illness. For the past year or more, patient has been having frequent headaches and sometimes she has vomited. Her eyesight has been failing for the past five months and more rapidly during the past two months. She has also had a gradually progressing deafness in the right ear which began about two years ago. She frequently has "shaking and trembling" attacks at night. She complains of giddiness when she attempts to walk.

Present Condition. Patient is a girl of moderately good nutrition. Her skin is of a somewhat bronzed hue. Her mentality is good and she answers questions intelligently. Her attitude is one of mild apprehension.

Face. The facial expression is pleasant, but somewhat vacant. The right eye is somewhat more prominent than the left and both eyes appear to be gazing vacantly into space. There is evidence of slight paresis in the right side of the face. There is a small subcutaneous lump about the size of a bean, raised above the surface level, in the region of the right supra-orbital ridge. It is moderately hard in consistency, freely movable, and not attached to the deeper tissues. About an inch lateral to the right eye there is a small epidermal excrescence and in the locality of the right mental foramen there is a similar one.

Eyes. Both pupils are rather large, the right more dilated than the left. Under a concentrated ray of light the right pupil contracts a little, but quickly rebounds to its original size. The left pupil does not respond to light at all, but there is consensual reaction in the left when the right is made to respond. The right eye is only capable of vague perception of large objects. The left eye is totally blind. There is no nystagmus. The right palpebral fissure is larger than the left and the left eye less prominent than the right. There is no paresis of the external ocular muscles. There is neuro-retinitis of both eyes with advanced secondary optic atrophy in the left and a lesser degree of optic atrophy in the right. In the latter it is more marked on the temporal side of the disc. Large objects can be seen in the temporal field of the right eye only.

Ears. The right ear is markedly defective in the perception of sound either by air or bone conduction. No evidence of previous otitis media. There is good hearing in the left ear.

Mouth. There is some prominence of the lower lip on the left side. The hard palate is high and vaulted.

Neck. There is a nodule in the posterior triangle of the neck on the right side, similar in character to the right supra-orbital one. The thyroid gland is abnormally prominent with bilateral and symmetrical enlargement. It is moderately soft in consistence and rises with deglutition.

Trunk. The thorax is somewhat undersized, long and narrow. The breasts are quite well developed and over the right one there is a deeply pigmented area with irregular outline, two inches in diameter. Below this there are several subcutaneous small nodules the size of a bean. There is a similar nodule in the abdominal wall of the right hypochondriac region. There is also on the abdomen a small warty growth to the right of the umbilicus.

Upper Extremities. The left arm is smaller and shorter than the right. The right shoulder is well developed and rounded; the left is lower than the right and the left scapula and scapular muscles are considerably smaller than the right. The muscles of the small left arm function well as far as the wrist, but the extrinsic and intrinsic muscles of the small left hand are atrophic and there is no grasping power. The right arm is normal and well developed. About the centre of the infraspinous portion of the left scapula there are two small moderately hard subcutaneous tumours, one being the size of a small walnut, the other the size of a bean.

Lower Extremities. There is some difference in the size of the muscles on the two sides, the right lower leg being somewhat smaller and showing a tendency to ankle-drop. There is a small subcutaneous nodule in the medial aspect of the middle third of the right thigh. It is fairly hard and freely movable. Pressure upon this provokes pain in the right knee. There is normal movement in the left ankle, but there is limited dorsiflexion of the right foot and there is diminished power of extension of the right toes. All other muscular functions of the two legs are normal, the strength being equal on the two sides.

Sensation. Sensation is undisturbed in the lower extremities, the trunk, the face, and the right arm. There is hypaesthesia and hypalgesia in scattered areas of the left arm.

Reflexes. (a) Superficial. The right epigastric is absent, the left one present. Both upper and lower abdominal reflexes are normal. Plantar reflexes are both normal.

(b) Deep. Both knee-jerks and ankle jerks are normal. Supinator jerk is present on the right side, but elicited with difficulty on the left. (c) Organic reflexes are normal.

Co-ordination. There is slight tendency to Rombergism, but no inco-ordination of hands and legs. There are no tremors, involuntary or volitional.

Viscera. Thoracic and abdominal viscera apparently normal in all respects.

Blood-pressure. Systolic 115, diastolic 60.

Temperature, pulse and respiration normal.

Urinalysis normal in all respects.

Cerebro-spinal fluid.

Increase of pressure (slight).
Increase of globulin content.
Increase of sugar content.
Cells normal.

Blood-counts normal in all respects.

Wassermann negative.

These data having been assembled, one of the subcutaneous nodules in the left infraspinous scapular region was excised under local anaesthesia and sent to the pathological laboratory for examination, where it was pronounced to be "soft fibroma."

Diagnosis. Generalized Neuro-fibromatosis, probably congenital in origin.

The distribution of the growths in relation to the signs and symptoms may be explained in the following manner of localization.

(1) Central neuromata or neuro-fibromata involving each of the optic nerves and the right auditory nerve, and very slightly the right seventh nerve.

(2) Peripheral neuro-fibromata of the face, body, and extremities.

(3) A plexiform neuroma involving the cervico-brachial plexus and cervical sympathetic nerves of the left side close to the cord.

A "follow-up enquiry" six months after the observation of this case elicits the following reply from her father. "Her general health is much the same, but she cannot see at all now, and is not able to walk. At times she shivers at night and becomes so weak that we have to go to her assistance. I see no hope of her recovery."

The salient points of the case are (1) the absence of a familial or hereditary history of similar diseases, (2) the scarcity of surface tumours and the prevalence of subcutaneous and central ones, (3) the progressive character of the lesions, (4) the combination of central and peripheral tumours, the latter causing symptoms earlier than the former, (5) the dwarfing of the left arm as a result of disturbed innervation, (6) the enlargement of the thyroid, (7) the hopelessness of any known therapeutics to eradicate or to arrest the progress of the disease.

In reviewing the literature of generalized neuro-fibromatosis, one is astonished to find such sparseness of material as exists. Textbooks refer to it in terms of glittering generalities. Neurological journals are almost silent. Very few cases have been reported. E. Christin and F. Neville report a case from Geneva in the Annales de Medicine, Paris, July 1920, in which thirty one intracranial tumours were found post mortem in a man 39 years of age, these tumours being very variable in structure and including gliomas, fibromas, neuromas, myxomas, osteomas, endotheliomas, and sarcomas. The patient at 17 had become suddenly completely deaf after sudden vertigo and a fall, but from that time to the age of 39 he had no other symptoms. L. H. Anderson also reported a case in the Journal of the American Medical Association of April 10, 1920. The patient was a woman of 38 with 3000 countable lesions on and below the skin surface. The right olfactory, oculo-motor, trigeminus, facial, and the cochlear branch of the 8th cranial nerve, appeared to be involved. Her perception of light remained only on the right side, dating from the age of six or thereabouts and coincident with the first tumour mass noticed. Left fundus and visual field normal, right fundus showing merely a small pale atrophic disc with no oedema or change in the retinal vessels. Right bulb proptosed. Nerve deafness in the right ear began a year after onset. J. A. Hutchison of Montreal also reported a case, details of which are not here available.

It is stated that only twenty-three cases of central neurofibromatosis are on record and that in 16 of these the first symptoms had appeared before the age of twenty and that intervals up to thirty-five years had passed without further disturbance. Central complete deafness is the hall-mark of the disease. Of the twenty-three cases of central neurofibromatosis, about two-thirds showed cutaneous lesions as well. Familial and hereditory influences were variable in their incidence.

References:

J. A. M. A., Apl. 10, 1920.

J. A. M. A., Dec. 11, 1920.

FRAGILITAS OSSIUM

C. W. Burns, M.D.

Winnipeg General Hospital

On the subject of fragilitas ossium, I have been unable to find much discussion in the medical literature. From the following history one would not only conclude that there is a marked hereditary tendency in this rare condition, but the tendency is for it to be transmitted by the females and to be manifested in the males.

In the past 10 to 12 years several male members of the family here referred to have been patients in the wards of the Winnipeg General Hospital. The clinical, and radiographic features have in each case been noted but have not been collected for publication. Since there have been upwards of 35 fractures, many of them still un-united, on the male side of the family, with a total absence of fracture on the female side; I would consider the history of sufficient interest to the profession to find a space in your columns.

J. W. a public ward case, age 35 years, apparently in the best of health except for the condition to be described, was born in North Dakota, the second boy in a family of eleven. He was brought up on a farm until 14 years of age, and at this age he claims to have been able to take a man's place at any variety of farm work. He never took an active part in athletics such as football, baseball, etc.

Present Complaint. Inability to get about because of un-united fracture of right femur of 19 years' standing. He was admitted to the Winnipeg General Hospital, April 21, 1920, suffering from a fracture of the surgical neck of the right humerus.

Past Illnesses. No serious illness at any period of his life, exclusive of fractures. He has been singularly free from ordinary childhood diseases. Mentality good, rather mechanical turn of mind.

Family History. Father, age 60 years, alive and well except for fracture disability to be outlined later. Mother alive and well, exceptionally active for a woman of 60 years, who has been the mother of a large family. Seven brothers all alive, five of whom have a multiple fracture history, with mal or non-union. Four sisters, three alive, one accidental death. No fractures in the cases of any of the girls.

Patient's Fracture History. 1. Fell off a building when 10 years of age, fractured the right humerus. Had arm in sling for three weeks. Had good use of it in six weeks.

2. In Feb. 1901, he fell off a toboggan, and fractured the left femur about the junction of upper and middle third. Four months after he was able to do manual labour, no disability other than slight stiffness of the knee.

3. In Jan. 1902, he fell while skating on the river, fractured the right femur, upper third. This fracture is still un-united in spite of operative and other surgical treatment.

4. April 1921, fractured surgical neck of right humerus which was considerable loss of function.

Fracture History of Family. Seven boys in the family, five of whom have had several fractures of both upper and lower limbs. Patient said "I can't tell you off-hand how many, but all of them are worse off than I am."

1. Eldest brother has fractured both femurs 2 or 3 times, has also broken his right arm. He has been an invalid for 12 years, because of un-united fractures of both femurs. His fracture history began when he was 8 or 10 years old.
2. Second Boy—is the patient described.
3. Third Boy—fractured the left femur 12 years ago. It is still un-united. He had a bone graft done several years ago, but without result. In 1901 he fractured the right arm but got union. He now gets about on crutches.
4. Fourth Boy—never any fractures.
5. Fifth Boy—robust fellow, works on telephone repair gang, has had several falls, never any bones broken.
6. Sixth Boy—has had at least 5 or 6 fractures of both legs and arms, all of which have united and are useful, except the last femur fracture 5 years ago, which has not firmly united (probably fibrous union). He gets about with support of a leg splint. Is very lame. Is engaged as assistant to father in a shoe-repairing business.
7. Seventh Boy—now about 21 years of age. Has had the most unfortunate history of all. Has had 8 fractures of arms and legs that patient knows of, perhaps more. Both femurs un-united. Gets about on a wheel chair.

The Father—is 60 years of age, has had three fractures. Eighteen years ago he fractured his right femur, and ever after endeavour to induce union failed. The thigh was eventually amputated in this hospital 12 years ago. Previous to this he had had fractures of both tibia and fibula, but union took place.

The Mother—is 60 years of age. The patient states there are very few women of her age who can do the work she does. She has had one fracture, as the result of falling on a galvanized pail.

The patient states there have been no miscarriages or abortions in the family to his knowledge. One of the brothers with a negative fracture history, is the only one who has had venereal disease so far as we can ascertain. The patient's Wassermann is negative.

Father's Sisters (3)—personally never any fracture trouble. One of the sisters has three boys, all of whom have fracture tendency. The other married sister has a family of girls, none of whom have had any broken bones.

In the case of the brothers who are married, there are boys in each family, but all are too young to expect trouble as yet. The sisters we noted were free from fracture history, but their sons have had fractures.

Flesh wounds heal normally as is seen by scars and operative histories. At the present time, two of the maimed brothers are in this city, and under observation. Two others are in a country town. They are engaged in a machine repairing business, and it is quite a novelty to see them get in wheel chairs to do their work.

References from Adami & MacRae's Pathology, p. 1059

"The etiology of the so-called 'idiopathic' or primary fracture is quite obscure. It comes on quite early in life, and may be congenital. The disease also runs in families. Apparently there is an insufficient apposition of bone, though the normal process of resorption is not interfered with. The result is a rarefaction of the bones which predisposes to fracture on the slightest provocation. Looser, regards it as an osteogenesis imperfecta tarda and osteogenesis perfecta. However, this is by no means clearly made out.

"As a consequence of the excessive resorption of the more solid portions the bones become brittle, and unable to support their accustomed burden and may readily fracture."

Mr. Cameron, assist. prof. of physiology in the University of Manitoba has made an exhaustive chemical urinalysis of a 24 hour specimen and this showed Calcium content to be high. We hope at a later date to report as to the exact chemical analysis of the bone substance (especially the femurs), since the histories would suggest that femurs in each of these cases are the most deficient in reparative power.

MULTIPLE POLYPI IN THE STOMACH (GASTRIC POLYPSIS)

ALEXANDER McPHEDRAN, M.D., L.L.D.

Toronto

THE following case came under observation recently. A woman aged about 50, no children. She has never been robust and has had many anxieties connected with outside affairs as well as with her household duties. For years her appetite was indifferent and she had daily discomfort in the epigastrium after meals. The bowels seldom acted without laxative drugs. As a result of all these causes she was weakly and nervous. Sleep was light and easily disturbed. She was thin and worn looking. The abdomen was flat and rather rigid. There were tender areas in various parts, shifting from time to time, not persistent in any part, not even in the epigastrium in which nothing abnormal was to be felt. The various reflexes were over active.

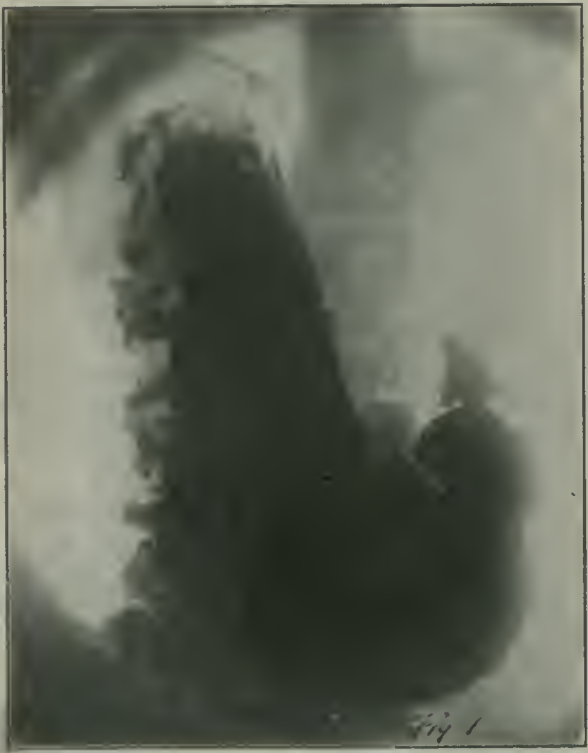

FIG. 1

There was nothing abnormal to be found conected with the lungs and heart. The urine was rather scanty and concentrated but she drank little water. Gastric contents an hour after some food consisted of a little almost clear mucus, quite anacid. No food or blood were present.

A period of rest under capable nursing care appeared essential to her improvement but before entering upon such a course it was decided to have an x-ray examination made of the gastro-intestinal tract to make sure there were no signs of ulcer or chronic appendicitis. Observation immediately after the barium meal showed a remarkable scalloping along the greater curvature throughout its entire length. (Fig. 1) Six hours later, about one-third of the meal was still in the stomach. In addition to the irregular greater curvature there were two or three oval areas appearing through the barium and on moderate pressure, other areas were seen doubtless due to the polypi on the anterior and posterior surfaces of the stomach coming into contact permitting the rays to penetrate and become apparent on the screen. (Fig. 2) The polypi evidently existed over all parts of the mucous membrane from the cardiac orifice nearly to the pylorus but they did not obstruct the latter. Their presence throughout the whole stomach precluded the possibility of relief by surgical means.

She was placed under good nursing care, with as liberal a diet as she could take and given hydrochloric acid and strychnine

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Presented at the session of the Association of American Physicians, Atlantic City, May, 1921.

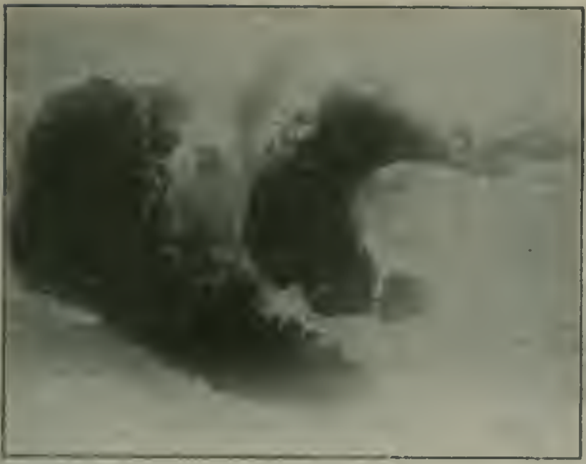

FIG. 2

freely with but little improvement, after two months of such care. The prognosis is of course unfavorable but depends much on her care and the degree in which her nutrition can be maintained.

The rarity of the disease is indicated by the fact that only two cases are on record in America. The first was reported in the Journal of the American Medical Association Vol. LXI, 1913, by J. A. Myers. In this case, a mass of polypi obstructed the pylorus. The mass was removed, but unfortunately the hemorrhage could not be completely arrested and death occurred three days later. The second one was seen by D. C. Balfour of the Mayo Clinic, the first occurring in their large clinic. (Surg. Gynec. obstet. 1919, Vol. XXXVII 465). Also by Carmen and A. Miller, Roentgen Diagnosis of Disease of the Alimentary Canal, 1920).

The polypi were disposed in irregular rows and varying in size from 0.5 to 2.0 cms. Their surfaces were smooth containing no glands. Their pedicles are thick, made up of greatly hypertrophied mucous membrane, muscularis mucosa, and a loose connective tissue core from the submucosa and contained fairly large arteries and veins. The depressions between the polypi consisted of mucous membrane in deep folds. (Fig. 3.) There was an abundant secretion of mucous, antacid, and without digestive property.

There is nothing in clinical history or physical examination of such cases on which to establish a diagnosis—all the symptoms occur in various organic and functional conditions. In advanced cases there may be hanematemesis and a sense of resistance over the stomach, especially the pylorus, the part most commonly affected. If lavage is done and tissue particles or polypi found, they would be an indication of the condition. Fortunately, however, an x-ray examination gives us the aid necessary to permit of an early and certain diagnosis being made.

I have pleasure in acknowledging the kind assistance of Dr. W. H. Dickson, chief radiologist for gastro-enteric diseases in the Toronto General Hospital, who made the first and second illustrations, and offered valuable advice in the diagnosis.

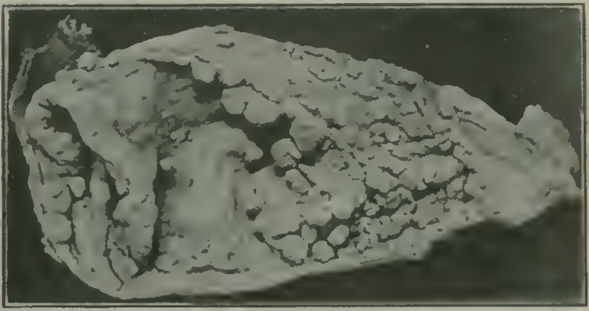

FIG. 3
(From Ewing's Neoplastic Diseases, page 631)

A SIMPLE METHOD FOR DETERMINING THE APPROXIMATE DEGREE OF ACIDOSIS IN DIABETES MELLITUS*

The Titration of Organic Acids in Urine, Van Slyke & Palmer

I. M. Rabinowitch, M.D.

LABORATORY methods described as aids to clinical diagnosis, become so, chiefly, when the technique involved is simplified to such a degree as to make the methods possible as a routine daily procedure rather than a special occasion.

The determination of the amount of acid excretion daily in a diabetic patient with acidosis, is certainly one of the most important laboratory reports the clinician may call for. The present most common method in use for determining this, is the gravimetric method of Van Slyke (1917). It is, however, time-consuming and complicated. Judging from the current literature on Diabetes Mellitus, this test is not employed as a routine daily procedure. In its place the amount of "acetone bodies" excretion is judged by the reaction of Ferric Chloride and the results obtained are reported in terms of plus, two plus, etc. This is, however, only a qualitative method.

In April, 1920, Van Slyke and Palmer (1), reported a method for titrating the organic acids in the urine. The method is simple and requires less than fifteen minutes. In comparing the results obtained by this method and by determining the actual total acetone bodies in the urine, acetone, aceto-acetic and B-hydroxybutyric acid, they showed that a remarkable parallelism is found. From the results obtained they point out that it appeared that:

(a) 95 to 100 per cent. of the organic acids titrated represents the total organic acids present.

(b) A rise above the normal output of organic acids may be used as an approximate index of acetone body excretion in diabetes

(c) Organic acid bodies other than acetone bodies are not excreted in significant amounts in diabetes and therefore,

(d) "the easily performed organic acid titration may be used for approximate estimation of the acetone bodies in diabetic urine."

During the past year nearly one thousand such determinations have been made in The Montreal General Hospital. This test has become a routine daily procedure in all diabetics, with or without acidosis.

The technique as described by Van Slyke and Palmer is as follows:—

"100cc. of urine, roughly measured are thoroughly mixed with 2 grams of finely powdered calcium hydroxide, allowed to stand about 15 minutes with occasional stirring, and then passed through a dry folded filter. This treatment removes carbonates and phosphates. To 25cc. of the filtrate in a 125 to 150 cc. test tube of clear glass, one adds 0.5 cc. of 1 per cent. phenol phthalein solution, and 0.2 N hydrochloric acid from a burette until the pink colour just disappears. 5cc. of 0.02 per cent. tropeolin 00 solution are then added. As the indicator solution is added it is thoroughly mixed with the urine by shaking the tube; if this precaution is omitted some of the tropeolin 00 may be precipitated. Finally 0.2 N hydrochloric acid is added from the burette until the red colour equals that of a standard solution containing 0.6 cc. of 0.2 N hydrochloric acid, 5 cc. tropeolin 00 solution and water to a total volume of 60cc. When the end point is approached sufficient water is added to the titrated solution to make its volume equal to that of the 60cc. standard solution used in a similar tube as a colour control.

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*From the Dept. of Metabolism of The Montreal General Hospital.

Calculation: From the volume of 0.2 N HC1 used to titrate from the end point of phenol phthalein to that of the tropeolin 00 the amount is substracted which is utilized in a similar titration of a control determination in which water is substituted for urine.

In order to calculate the results in terms of cc. 0.1 N organic acid per litre, the figure representing the cc. of 0.2 HCE used in the titration is multiplied by 80, i.e. (1000 ÷ 25 = 40 in order to transfer figure from 25cc. to 1000cc. of urine, and by 2 to change from 0.2 N to 0.1 N terms.)

From a practical clinical point of view these are the essentials of the test.

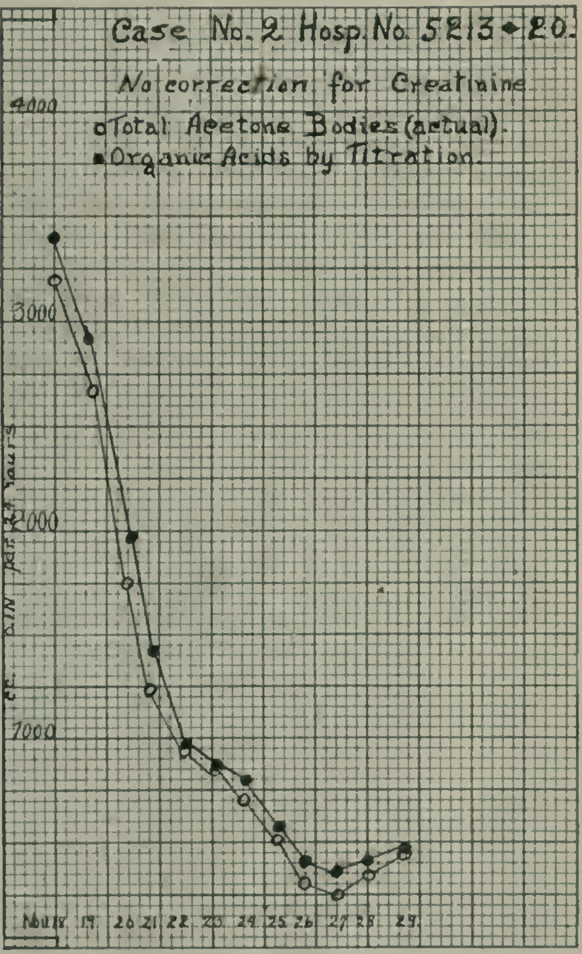
Theoretically, and for absolute accuracy, as these authors have shwon, corrections should be made for creatinine, creatine, and amino acids, which are included in the results obtained by the above method.

The following are charts, all of diabetics admitted to the Montreal General Hospital with varying degrees of acidosis. Their progress was noted by the daily determination in the urine of acetone and diacetic acid qualitatively (Nitro prusside and Ferric chloride test), quantitative determinations of titratable acid, titratable acid plus ammonia, total acetone bodies, total organic acids (by the method described) and ammonia. The plasma CO2 combining power (Van Slyke) was determined every third or fourth day as the clinical or other laboratory findings indicated.

It will be noted that in Case 1, corrections were made for creatinine daily. In Case II no corrections were made for creatinine whatever. In Case III daily corrections were made for creatinine, but no "blank (water)" corrections were made. In Case IV no corrections were made either for "blank" or creatinine. In Case V the creatinine excretion was determined on the first day of observation and this figure was accepted daily for correction. The latter method is employed at the present time in the routine of this laboratory.

By plotting a curve, the abscissae for the dates, and the ordinates for the quantity of excretion of total acetone bodies and organic acid in terms of 0.1 N cc. per 24 hours, the remarkable parallel results are noted in all the above charts, in spite of the variations employed in the method. This apparently proves that for practical clinical purposes, the technique as described by Van Slyke and Palmer as given above, (without corrections for creatinine, thus making the method still more simple), is an accurate index of the course of a diabetic acidosis.

Occasionally, a discrepancy occurred when the two methods were compared. The total amount of actual acetone bodies was found to be greater than the total organic acids present as determined by the new titration method. This the writer is unable to explain.



This occurence was, however, very uncommon, and when it did occur as shown in Chart 1, days 12 and 13, the results did not differ markedly enough to alter the clinical value of the test.

Although the advantage of employing this method becomes quite apparent, it nevertheless, in no way, minimizes the importance of determining the qualitative reaction for "acetone bodies" daily by the Ferric Chloride method. In fact its daily performance is essential in interpreting the results obtained by this new titration method. This must be emphasized for two reasons:—

(a) The Ferric Chloride is the most practical and the most generally applicable test we have.

(b) As pointed out by the authors of this test and as shown in Chart 3 beginning on the 9th day, it is not the total figures obtained, but the rise above the normal figures, that gives an index of the degree of acetone body excretion found in diabetes.

It is therefore necessary to perform the Ferric Chloride Test daily. When the latter becomes negative it may safely be assumed that the organic acids found represent the normal excretion. The average normal excretion is about 500 cc. 0.1 N.

Judging from the current literature, little consideration has been given this practical valuable test. It is for this reason that this paper is presented for publication. Especially, in view of the fact, that only qualitative analyses are reported, the more accurate quantitative methods being apparently regarded as time consuming and therefore not employed.

CASE 1. Hosp. No. 4750-20. Male, Age 35. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Creatinine cc. 0.1 N
Oct. 20.	2620	3000	33	47.6	220
22.	1960	2204		46.5	260
22.	1640	1804		46.8	190
23.	1510	1710	48	46.9	210
24.	1430	1640		47.0	66
25.	Total	Urine?	51	47.8	110
26.	1170	1580		48.2	120
27.	1260	1476	58	47.0	70
28.	640	870		46.3	86
29.	530	650		48.0	92
30.	390	430		46.3	60
31.	1060	860	58		76
Nov. 1.	960	710		49.3	84
2.	710	860		51.1	120
3.	1120	1200		52.0	60
4.	960	860	60	51.8	98
5.	620	720			86
6.	430	620		51.0	

CASE 2. Hosp. No. 5213-20. Male, Age 11. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Creatinine cc. 0.1 N
Nov. 18	3226	3420	31	31.1	
19.	2680	2860		30.6	
20.	1760	1960	36	33.9	
21.	1240	1416		31.7	
22.	920	960	40	33.8	
23.	810	860		32.2	
24.	714	800	46	31.1	
25.	510	520			
26.	310	380	52	30.4	
27.	260	360		30.0	
28.	360	410		29.8	
29.	420	460	60	29.1	

CASE 3. Hosp. No. 4887-20. Female, Age 19. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Creatinine cc. 0.1 N
Oct. 28.	1860	2030	46	57.2	116
29.	1700	1910		57.4	82
30.	1520	1630	49	57.1	70
31.	1110	840		57.7	96
Nov. 1.	860	610	58	57.7	84
2.	920	620		57.5	68
3.	410	360	60	57.0	72
4.	710	896		57.0	84
5.	120	520		57.1	66
6.	60	620		57.	64
7.	52	410	61	57.	59
8.	49	360		57.1	86
9.	76	480		57.2	72
10.	84	620	60	57.1	63

CASE 4. Hosp. No. 4824-20. Female, Age 22. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Creatinine cc. 0.1 N
Oct. 24.	4240	4020	40	42.2	
25.	3416	3640		40.0	
26.	2340	2620	50	39.8	
27.	1360	1600		40.0	
28.	710	810		39.1	
29.	640	762	56	39.4	
30.	790	860		39.5	
31.	416	516		37.9	
Nov. 1.	520	616	60	42.6	

CASE 5. Hosp. No. 2985-20. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Creatinine cc. 0.1 N
July 3.	2520	2620	48	54.7	116
4	1960	2160		55.2	
5.	1800	1820		55.0	
6.	1460	1600	55	54.7	
7.	1180	1260		55.0	
8.	860	980		54.2	
9.	810	1020	54	55.9	
10.	760	960		55.6	
11.	640	720		54.7	
12.	1090	1400	50	55.0	
13.	460	640		54.7	
14.	810	820		53.4	
15.	620	760	57	53.4	
16.	540	614		53.5	
17.	630	780		53.9	
18.	420	690	60	54.4	
19.	200	320		54.5	

Reference:—

1. Van Slyke, Donald D., and Palmer, W. W. The titration of organic acids in urine. Jour. Biol. Chem. Vol. XLI. No. 4, page 567. (April, 1920).

THE BACTERIOLOGY OF INFECTIOUS DIARRHOEA*

Stanley G. Graham, M.B.

Resident Bacteriologist, Hospital for Sick Children, Toronto

ORGANISMS belonging to the dysentery group of bacilli have been isolated from the stools of infants suffering from "summer diarrhoea" as long ago as 1902 by Duval and Bassett (1), and again, in 1903, by Wollstein (2). The name "summer diarrhoea" naturally includes all diarrhoeas occurring in the warm months, irrespective of etiological factors. Such diarrhoeas may be caused, in general, by two conditions—first, acute infections of the intestinal tract, and second, the result of some chemical disturbance.

According to the present terminology, infectious diarrhoea is the type representing acute infections. These cases are very definite clinical entities, and can be recognized by their more or less sudden onset, accompanied by a febrile reaction. The stools, in a remarkably short time, show the presence of blood, mucus and pus.

It is from this type of case that the dysentery bacilli have been isolated. In looking over the literature, cases of simple diarrhoea in children have never been proven to be due to a dysentery bacillus. Davison (3) in 1920, cultured stools from sixty-three cases of simple diarrhoea in infants and young children, and in no instance did he isolate a dysentery bacillus. The stools of these cases were mainly faecal in character, and at no time contained pus. The stools of twenty infants suffering from a fermentative type of diarrhoea were cultured during the summer of 1920 in the laboratory of the Hospital for Sick Children. No organisms resembling dysentery bacilli were isolated, although repeated cultures were made in many instances.

From time to time since 1902, various workers have isolated other organisms, which they have suggested as causing an acute ileo-colitis in children. Some observers (4 & 5) have laid stress on the presence of Bacillus aerogenes capsulatus as a factor in its production. This organism has, however, been repeatedly demonstrated by Knox and Ford (6) in 1915, and by Davison (3) and others, as an inhabitant of apparently normal gastro-intestinal tracts of infants and young children. It seems unlikely, then, that this organism is in itself the primary cause.

In 1906, Morgan (7), an English writer, in a series of fifty-six cases, isolated a non-lactose fermenting bacillus in twenty-eight. This organism, showing certain definite reactions on sugars, he named Bacillus Morgan No. 1. Later, in feeding experiments on animals, he succeeded in producing a diarrhoea, and subsequent death, in eighteen. This organism was for some time credited, especially in England, as being the possible cause of infectious diarrhoea in a certain percentage of cases. Davison (3), however, has isolated it repeatedly from the stools of cases of ordinary diarrhoea, as well as from the stools of normal healthy children. It has also been observed that this organism is frequently found in conjunction with one of the types of dysentery bacilli in infectious diarrhoea, more often towards the end of the disease. One case of this type was observed in this series last summer in our laboratory. The case entered hospital on the sixth day of the disease. Repeated cultures made daily from admission until the death of the child failed to reveal the presence of a dysentery bacillus. Morgan's bacillus, however, was isolated shortly before death. At autopsy, the characteristic pseudo-membrane lining the large bowel and ileum was demonstrated. As the result of serological tests, it was never possible, in any instance, to demonstrate agglutination of the organism by the patient's serum. Hence it is reasonable to assume that bacillus Morgan No. 1 plays a very small part, if any, in the etiology of this disease.

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*From the Wards and Laboratories of the Hospital for Sick Children, Toronto.

Womack (8), in 1919, suggested as a cause a highly virulent colon bacillus, but as yet there is no evidence to favour such an assumption. Other organisms which have been suggested as causative factors, are the streptococcus and bacillus pyocyaneus. Both of these organisms have been repeatedly cultured from the stools of healthy children, and also adults. At the present time, there is no conclusive evidence that they are of pathological significance in the intestinal tract in such cases.

So that, at present, the only organisms which have been isolated from the stools of cases of infectious diarrhoea, and which have not been found in the intestinal flora of healthy children, are the members of the dysentery group of bacilli.

During the six months, from June 1st, 1920, until the end of November, the stools of twenty-nine cases of infectious diarrhoea were investigated as a routine measure in the Bacteriological Laboratory of the Hospital for Sick Children. All these cases were of the type which suggested an acute infective process, the stools containing, in each instance, blood and mucus, as well as pus—either macroscopic or microscopic.

Stools were examined as far as possible daily, until it was proved definitely that a dysentery organism had been isolated. The length of time elapsing between the onset of the illness and admission to hospital varied from a few hours to fourteen days. In the cases of long duration, when the stools were not obtained until late in the disease, the causative organism was much more difficult to isolate, and, in a number of cases, was not found.

The technique employed was as follows: Cultures were always made as soon as the stool was obtained. A small portion of mucus containing blood and pus cells was first washed in sterile saline, and then broken up in a few drops of fresh saline. One loopful of this was used to streak two plates of Endo's media. The plates were incubated for eighteen hours, after which time, the white colonies were picked and transferred to glucose agar to determine whether the organisms were gas-producing or not. If they were gas-producing, they were discarded; if not, smears were made, and the organisms cultured on triple sugar media. At this stage, a tube of plain broth was inoculated to determine the presence or absence of motility. If, after incubation over night, the organism proved to be a gram negative non-motile bacillus, producing a red butt and colorless slant on the triple sugar media, it was classed as belonging to the dysentery group. Fermentation tubes of Dunham's peptone solution containing one per cent. of the following sugars were inoculated—glucose, mannite, lactose, maltose, saccharose, dextrin and inulin. The type was determined according to the reactions on the sugars.

By this proceedure, out of the twenty-nine cases studied, eighteen yielded positive cultures of dysentery bacilli—that is sixty-two per cent. Had standard strains of dysentery bacilli been available at the time a large percentage of the remainder would undoubtedly have been proven to be of similar origin by serological tests.

Of the eighteen strains so isolated, sixteen proved to be of the Hiss-Russell type, that is, fermented only glucose and mannite. The remaining two were of the Flexner type—that is, fermented maltose, saccharose and dextrin, in addition to glucose and mannite. These reactions on the sugars were observed shortly after the organism had been isolated from the stool. Subsequent examination shows that they are not constant on the same sugars. A certain number of the Hiss-Russell strains after several months showed some change on maltose and dextrin, as well as glucose and mannite. The two Flexner strains have remained constant.

From these results, it would appear that the organism responsible for the majority of the cases is of the Hiss-Russell type. It does not follow, however, that this type is always the most common. It is quite probable that, during the next summer, or during the past summer in other centres, some other type, such as the Flexner, or even the non-mannite fermenting Shiga would be predominant.

Direct smears stained by Gram's method were examined from every specimen cultured, and a report made as to the presence of pus cells and the types and numbers of organism seen.

In stools obtained from cases early in the disease, the picture seen on direct smear was almost typical, and could undoubtedly be used to advantage in the diagnosis of a dysentery infection. There were always pus cells present. The total number of organisms seen was always surprisingly small, and the predominating organism almost invariably a Gram negative bacillus. In addition, there were usually seen Gram positive cocci arranged in pairs, or occasionally in short chains, and a few large Gram positive bacilli. In the ten cases of this series which were admitted on or before the fourth day of the disease, the descriptions of the direct smear in each case showed the above characteristics.

The direct smears from the later cases were not so typical on account of the influence of diet on the intestinal flora. In cases admitted late in the disease, the picture was entirely different. Pus cells were almost invariably present, but the numbers and kinds of organisms tended to be very large and varied, and in some instances resembled the picture seen on direct smears of normal faecal stools. With the feeding of a high carbohydrate diet, the field changes very markedly with the advent of the fermentative type of intestinal flora. The organisms tend to become more numerous, the long thin type of Gram negative bacillus makes its appearance, and such organisms as bacillus acidophilus and bacillus bifidus are seen more often and in greater numbers. These changes are most definite, and in some cases can be watched from day to day.

CONCLUSIONS

1. In a series of twenty-nine cases of infectious diarrhoea at the Hospital for Sick Children during the summer of 1920, sixty-two per cent. were proven by cultural methods alone to be due to bacillus dysenteriae.

2. The type prevalent in this series was the Hiss-Russell.

3. It would appear from this comparatively small number of cases, that direct smears made from stools early in the disease—that is before the fifth day—are invaluable in making a tentative diagnosis of dysentery.

I take this opportunity of thanking Dr. Alan Brown and Dr. I. H. Erb for their kindly suggestions and criticisms.

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REPORT OF A CASE OF THROMBOSIS OF THE AORTA AND ILIAC ARTERIES FOLLOWING PNEUMOCOCCAL INFECTION OF THE UMBILICUS

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INFECTION of the umbilicus occasionally occurs in spite of every precaution. The infective agents may be any of the pyogenic organisms, but most commonly belong to the streptococcus group. In 477 autopsies performed at the Hospital for Sick Children since June, 1919, there have been nine cases of umbilical infection. The organisms recovered, by means of blood culture and cultures from the umbilicus and any metastatic areas of inflammation, have been as follows:

4 cases Streptococcus haemolyticus
1 case Streptococcus mucosus capsulatus
1 case Pneumococcus
3 cases Staphylococcus pyogenes aureus.

As a result of umbilical infection, one may have:—

1. A localized inflammatory process.
2. Erysipelas.
3. Peritonitis.
4. Thrombo-phlebitis of umbilical vessels
5. Septicaemia, including pyaemia.

It is undoubtedly true that septicaemia occurs in practically all cases when the infection spreads beyond the umbilicus.

In the nine cases at the Hospital for Sick Children, there were five cases of peritonitis, two of septicaemia with no localizations, one of multiple abscess formation involving organs and joints and one with thrombosis of the hypogastric and iliac arteries and the abdominal aorta.

In addition to these nine cases of umbilical infection there have been several cases of erysipelas originating on other parts of the body, cases in which the inflammatory process reached the region of the umbilicus and was followed by a fatal peritonitis, showing the umbilicus to be an open portal of entry for infection.

The age incidence of umbilical infection in these infants varied from fourteen to twenty-one days, i.e., death occurred in all of the cases during the third week after birth.

Most of the cases showed a reddening and peeling of the skin, several being strongly suggestive of congenital syphilis, especially when the umbilicus showed only slight evidence of any inflammatory reaction. This peeling of the skin is probably a cutaneous manifestation of the septicaemia; in congenital syphilis it is also simply a manifestation of generalized syphilis. As a rule in cases of septicaemia of umbilical origin, the bullae on the palms and soles, which are so characteristic of congenital syphilis, are not found.

It was formerly believed that syphilis was the cause of nearly all inflammatory conditions of the umbilicus, but this view has been proven to be incorrect.

Creadick gives the results of a series of twenty-two hundred consecutive births in which microcsopic examinations of the cord were made. In forty-three instances, i.e., 1.9 per cent., there was evidence of inflammation. To demonstrate his point, he has divided his cases into two groups. The first group comprises those cases that occurred before placental bacteriaemia was considered. In the second group are placed the later cases in which strict precautions were observed, especially in making examinations after the membranes had ruptured. In the first group the incidence of cord lesions was 2.1 per cent.; in the second it was reduced to

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From the Wards and Laboratories of the Hospital for Sick Children, Toronto.

1.5 per cent. This decrease he ascribes solely to the fact that more care was taken not to introduce septic material into the uterus.

Report of Case

A full term, male child, normal birth.

Admitted—July 6, at 8.30 p.m.

Died—July 7, at 3.30 a.m.

Age—10 days.

Nursed for 9 days and then refused breast.

Complaint on admission:—

1. Legs turning black—12 hours.
2. Peeling of skin—since birth.
3. Refusing nourishment—1 day.

Early in the morning of July 6, (the day of admission) the nurse noticed dark areas on the baby's legs and by noon the legs were dark in colour. Bowel movement in the admitting-room, in the evening of July 6, was yellowish-green.

Skin over the body was scaling.

Temperature, 98°F.

Post-mortem made seven hours after death:—

The peritoneum was smooth and glistening, but was slightly congested.

Lungs showed many sub-pleural petechial haemorrhages.

Liver was quite fatty and just where the round ligament enters, there was a pyramidal-shaped portion about the size of a small walnut which was darker red in colour. On sectioning this, there was found in the centre a thrombus in a medium sized vein which was traced back through the umbilical vein to the umbilicus.

In the large and small intestines, there were many submucous petechial haemorrhages.

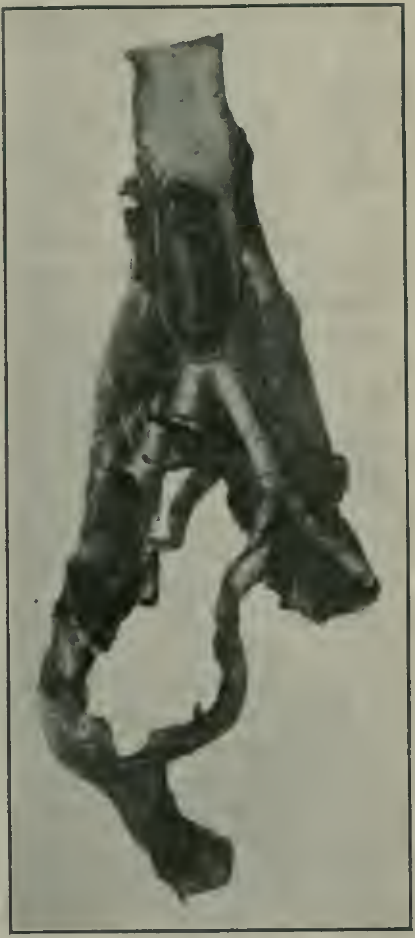
On opening the aorta, it was found to contain a thrombus which extended from a point about one quarter of an inch below the origin of the inferior mesenteric artery down to the bifurcation, into the right iliac artery and then into the right hypogastric artery to the umbilicus. The thrombus extended for a short distance into the left iliac artery.

The lumbar and iliac glands in this region were moderately enlarged and beefy red in colour.

Cultures taken from the peritoneum, umbilicus and heart's blood showed pneumococci in all tubes except in the material taken from the peritoneum, which was sterile.

Microscopic examination of the lungs showed early broncho-pneumonia with sub-pleural haemorrhages. Microscopic examination of the liver showed congestion and fatty infiltration, being further confirmatory evidence of a bacteriaemia.

On searching for reports of similar cases, I have been able to find only one which was reported by Moschcowitz (2) in the Proceedings of the New York Pathological Society, but unfortunately there was no copy available. The article was entitled—"Report of a case of Thrombosis of the Aorta and both Iliac Arteries, following Streptococcic Infection of the Umbilical Cord."



Showing thrombus extending from the aorta down into both iliac arteries

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ASTHMA— ITS RELATION TO FOCAL INFECTIONS

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FOR some time past our attention has been drawn to this disease because of the change of the medical conception as to the possibilities of doing more for our patients than has been accomplished in the past. These sufferers go on from year to year, are advised to change climate and move from place to place, some receiving benefit, others merely spending their money with no good results. It would, therefore, appear that in this field much should be done to materially benefit these sufferers.

The present classification of the disease gives us two distinct types, viz.: (a) Bronchial Asthma and (b) Asthmatic Bronchitis.

While it is not always possible to classify a case dogmatically, it is always of distinct assistance to endeavor to assign it to one class or the other with a view of carrying along a line of treatment adjusted to suit the predominance of either the asthmatic or the bronchitic features.

In all of these cases there is a nervous condition which makes the respiratory tract susceptible to some protein whether it be from pollen, from animal dust, from food or from the products of bacterial invasion. Brodie and Dixon (1) have shown that the vagus is the only motor nerve to the bronchial muscles and that in this nerve run two sets of fibres, the constrictor and the dilator. Examination of the sympathetic nervous system in their work gave negative results. They found that stimulation of the constrictor fibres of the vagus could be excited by various irritants of the nerve itself, or of the respiratory mucous membrane and a typical attack of asthma produced—prolonged expiration, over-distended air-cells, dry rales, absence of excessive secretions in the bronchi with no engorgement of the lung. In these cases in which a definite protein is the cause of the typical attack, it is evident that the protein affects the upper respiratory tract by producing an irritation of the constrictor fibres of the vagus. This in turn produces a stenosis of the smaller bronchi owing to the contraction of their circular muscular fibres. In the cases in which bacteria play an important part producing a more or less typical attack there is usually an associated infection of some part of the respiratory tract. In this class of cases examination will probably reveal trouble in the nasal chambers, accessory sinuses of the nose, infection of the teeth or of the tonsil.

Another class of cases will show that the infection is located in some other part of the body as the appendix, gall-bladder, the intestinal tract and rarely reflexly from some abdominal hernia. We have all noted cases having asthmatic symptoms which were secondary to cardiac and renal disease but these are always more or less atypical in their type.

"While all have become well acquainted with the typical symptoms, it might not be out of place to briefly review these. The irritant produces, though the vagus supplying the circular bronchical muscles, a narrowed lumen of the bronchi extending well down to the air-cells. The weaker expiratory muscles are unable to return the full amount. This is repeated a few times, when the air-cells naturally become over-distended. The act of expiration becomes prolonged and is difficult. Cyanosis is marked, the patient's face bears an anxious expression and he becomes apprehensive as to the outcome of the attack. A dry cough now usually sets in followed by the expectoration of some mucous secretions and the attack is over. Fluoroscopy if done during the attack will show a fixed diaphragm, usually depressed or in a position midway between the limits of its excursion for expiration and inspiration. The attack may last for only a short time or may be carried on for days. Beyond fatigue following such exertion the patient is in a normal condition until another attack is precipitated by exposure to the same protein as in the first case.

Walker (2) in classifying the cause of bronchial asthma by means of the cutaneous or skin tests, shows that there is the true or sensitive type which may be distinctly separated from the atypical or non-sensitive type. In the latter, what we should call asthmatic bronchitis, bacteria play a very important part. Only 48 per cent. of his cases were sensitive to the proteins of pollen, animals and food. The other 52 per cent. were non-sensitive, while 10 per cent. of the sensitive cases could be traced to bacterial proteins. Of these the most common bacteria were staphylococcus pyogenes aureus, streptococcus haemolysans, staphylococcus pyogenes albus and streptococcus viridans. No doubt many other bacteria produce proteins that will give like results. In many cases the patient is no doubt subject to different proteins as pollen, feathers, hair and food. The prolongation of these symptoms, however, is kept up by bacteria adding their quota to the sum total of irritants.

The object of this paper is to more particularly draw attention to some of the benefits to be derived in a certain class of case by determining the location of the bacteria and removing it. The location of the site of infection is not always easy, but the results, when once they are removed, usually produces decided improvement.

In making such an examination it becomes necessary to investigate each organ of the body carefully and systematically. The nose with its accessory sinuses should receive particular and careful attention both for infections and deformities. The x-ray and transilluminator will prove of valuable assistance. The tonsils if infected should be removed. The teeth, where at all suspicious, should be x-rayed for abscess or unerupted molars. In the examination of the chest one should endeavor to locate or exclude early tuberculosis of the lung, syphilis of the lung, chronic bronchitis or bronchorrhoea. Where physical examination suggests thickening of the lung tissue anywhere this should be confirmed by the x-ray. The examination of the heart is made with a view to discover aortic changes and in doing this note should be made of its relative position, of its size and particularly the condition of the muscle of the right heart. The continued strain on the right heart in asthmatic subjects will show itself in weakened and thin muscles and improvement sometimes takes place by using cardiac stimulants. A search in other parts of the body for reflex irritation or foci of chronic absorption leads us to examine appendix, gall bladder, fallopian tubes, ovaries, hernia, etc. The Wassermann test is of great value. A complete urinalysis and a differential sputum analysis should be made in all cases. Some physicians have been impressed with the value of a bacteriological examination of the stools, but of this we have no knowledge or experience. The protein sensitization tests for the various foods, pollens, animal epidermal proteins are also of great value, but do not come under the scope of this paper.

Once having located the foci of infection the treatment is definitely indicated and in this connection we would like to present a few illustrative cases:—

Case No. 1.—This was a woman of about 45 years of age, who had tried various climates to relieve herself of asthmatic attacks which had become so severe that she was unable to work for two years. She had lost about 20 lbs. in weight with attacks coming on every night and occasionally during the day. Complete physical and laboratory examination negative but the x-ray showed numerous abscessed teeth. These were removed under a local anaesthetic following which she had severe haemorrhages from the gums and was confined to bed for a week. During this time her attacks of asthma disappeared and she remained clear for several months, when an attack of influenza brought on a return of some of her old symptoms. From these she improved and was much better when she dropped out of our care.

Case No. 2.—Locomotive engineer, aged 40. Had had typhoid ten years before followed by an abscessed tooth. For several winters he had had attacks of bronchitis which became more continuous. About seven years ago definite symptoms set in which grew steadily worse till he was forced to move West in search of health. Complete examination was negative in all respects except for some emphysema and a few abscessed teeth. These were promptly extracted under a local anaesthetic and he noted improvement in a few days. Since then he has had no return of his asthma and bronchitis, but is subject to hay fever, and is sensitive to the protein of feathers but not sufficient to prevent him from working. An attack of hay fever at the seasons when the pollens are most prevalent brings back an attack of bronchitis, but this lacks the definite asthmatic symptoms from which he had suffered before. It is evident in his case that the bacterial invasion through his tooth set up a definite bronchitis upon which was implanted the asthmatic symptoms and that he has a separate and distinct protein sensitization for certain pollens and for feathers, but we are quite satisfied that the chronic absorption from the abscessed teeth added much to making him the subject of bronchitis.

Case No. 3.—Farmer aged 45. Had had asthma for 11 years to such a degree finally that he had to quit work on his farm and to seek relief by changing climate. Complete examination of chest, nose and throat, urine, etc., was negative, but the x-ray showed a number of abscessed teeth with pyorrhoea. These were removed under a general anaesthetic and in three weeks he had no asthmatic symptoms. For six months he made a steady gain in weight until he was back to normal and at the end of a year was working in a saw-mill every day and feeling perfectly well.

Case No. 4.—Farmer aged 38 who left the Pacific Coast seeking relief from his asthma which had extended over four years. His history shows that he was subject to colds and bronchitis during the winter and was usually better, although not clear of his trouble during the summer. Complete examination showed everything negative except a trace of albumin in the urine with a few pus-cells, and four abscessed teeth—lower incisors—which had been injured when he was a young man. The removal of these teeth under a local anaesthetic was followed by a very acute attack in two days which gradually disappeared and has not since returned. An interesting feature in his case is that the albumin and pus in his urine has likewise disappeared and he seems to be perfectly well.

Case No. 5.—Merchant aged 40, complained of asthmatic attack coming on in the early morning with a sense of constriction about the chest wall and a loss of weight extending over some months. His examination was negative except for abscessed teeth which were promptly removed under a local anaesthetic. His asthmatic symptoms disappeared and he readily gained his loss in weight, but he is still sensitive to certain pollens and has seasonal attacks of hay fever.

The results of such cases as these have convinced us of the value of careful examination of the teeth to correct or exclude alveolar abscesses or pyrrhoea.

Case No. 6.—Laborer aged 35. Had had asthma for ten years and had visited various parts of the country seeking relief. He came here from Calgary and developed a most violent attack that required a half a grain of morphia hypodermically to control. He gave an indefinite history of having some venereal infection fifteen years before. Complete examination was negative except for slight dullness over the roots of both lungs. Wassermann was four plus positive and the x-ray showed peribronchial masses and hilus thickening of both lungs. He was placed on intensive treatment of Neo-diarsenol with Grey oil hypodermically and large doses of potassium iodide by mouth. In a few weeks his asthmatic symptoms disappeared and after following up the full course of ten doses in the hospital was discharged and the last heard of him he was working on a ranch with no return of his symptoms.

Case No. 7.—Miner aged 50. He came from the United States seeking relief from asthma. He had been unable to work for three years, he had grown emaciated, was very weak and was suffering from difficult asthmatic breathing at all times even during the day. His attacks of asthma at night prevented him from sleeping. After having a positive Wassermann reaction he gave a history of a luetic infection 18 years before. The complete examination showed areas of dulness over the roots of both lungs and the x-ray picture illustrates large oval bilateral opacities in the region of the hilus. He was started on our routine luetic treatment and in a few days noted a decided improvement and after following up the treatment for a few weeks he had lost all his asthmatic symptoms, had no impairment of breathing and has returned to work.

In these cases it is a little difficult to say where the source of irritation arises, but we feel it is due to the gummatous invasion of the lung involving some of the filaments of the vagus nerve which reflexly causes irritation of the constrictor fibres of that nerve. These cases show the necessity of eliminating syphilitic infection as a possible cause of asthmatic bronchitis.

Case No. 8.—Housewife aged 45. This patient came from the Prairies seeking a change of climate. She was very much emaciated and whenever she contracted a "cold" had repeated attacks of asthma every few hours. when she was clear of her "cold" usually had an attack of asthma during the night. Her trouble had evidently developed some four years before, following an attack of quinsy. For two years she was subject to bronchitis following this attack when the asthmatic symptoms were implanted upon the bronchitic. The combined symptoms had made it so that she was unable to do any work. Examination of the nose and throat revealed a badly infected tonsil on the right side with marked irritation of the upper respiratory tract. Examination of the chest showed a diffuse bronchitis, while the quantity and character of the sputum suggested bronchorrhoea. The tonsil was removed under local anaesthetic with the results that within a few days her asthmatic symptoms began to disappear and for some time she remained clear of her asthmatic attacks until she contracted the epidemic influenza, when she had a return of her asthma in a milder form. She made a slow recovery from this until she lost her asthma entirely, but has a considerable amount of bronchitis. An interesting point in her case is that a recent report upon her sputum from the Vancouver General Hospital shows a gram neganegative diplococcus with abundance of bacilli which the bacteriologist states is probably the colon bacillus. An autogenic vaccine is being used in her case with very satisfactory results.

The interesting feature of this case is that it demonstrates that tonsillar infections give rise to bronchitis and that upon the consequent bronchitis there were implanted the nervous symptoms giving rise to asthma. It also shows that tonsillectomy is justifiable in all cases of asthma where it can be found through the history and the condition observable that this organ is an offending member.

Case No. 9.—The patient aged 37, office man had had fibroid phthisis for 19 years. Had had sanatorium treatment and had the usual relapses with haemorrhages. His tubercular disease had invaded almost every part of his lung with the consequent compensatory emphysema. He had shortness of breath on exertion, some morning cough, a small amount of positive sputum while his general condition was fair. He had an attack of cholecystitis and while under treatment developed a secondary gastritis. This cleared up under rest and diet with the usual treatment and he seemed to be about normal. For several years, however, following an infection of his nasal chambers and frontal sinus he has had typical attacks of asthma. With this he always complained of a sense of congestion of the nose, a feeling of oppression and discomfort over the bridge of the nose and some frontal headache. With this he generally felt dull mentally. His case was suggestive of ethmoidal empyema and this opinion was confirmed by the x-ray to such a degree that it was decided to drain the anterior ethmoidal cells surgically. Owing to his general condition being poor this was done in two stages, first the removal of the posterior end of the superior turbinate bone which gave decided relief and freer drainage for large quantities of mucopurulent secretions. Upon opening and draining the ethmoidal cells he lost his asthmatic attacks and with that the hyper-sensitiveness of his nasal mucous membranes.

For generations both physicians and patients have demonstrated the benefit to be derived by a change to a higher and drier climate and in this connection we might suggest that the improvement noted in asthmatics may be due in some degree to the improved drainage of the accessory sinuses due to the lessened congested condition of the mucous membrane of the nose and these sinuses.

Case No. 10.—Mechanic aged 40. Has had asthma for four or five years steadily. The chest examination showed signs of early tubercular thickening at hilus of right lung and he is at present under treatment with tuberculin. The results so far are very satisfactory as he reports no attacks, but it is too soon to be sure of our results.

Case No. 11.—This case is one of a young man of 17 who complained of shortness of breath, worse at night and with a sense of constriction about the chest. The removal of an abscessed tooth promptly relieved all symptoms.

Case No. 12.—This man aged 47 had bronchitis for past four years, and during this time had occasional attacks of asthma. These attacks had become more severe and more frequent for past four months. Complete physical and laboratory examination negative except for infection of right lower second molar. Extraction cleared up his symptoms in three weeks.

Case No. 13.—This man aged 36 had first attack of asthma in June, 1919, to recur again in Dec., 1919, when he had his tonsils removed. He was then well until May, 1920, when he had a return of his attacks. Complete examination both physical and laboratory negative except one abscessed molar. He improved promptly and a short course of potassium iodide cleared up his symptoms.

In conclusion I would like to draw attention to the fact that many of the asthmatic bronchitic cases of the middle aged can be benefited by the location and removal of their focus of infection. This may be done by surgical means or sometimes by vaccines and in the event of these failing, it is well to advise climatic and hygienic changes.

It is interesting to note that there is no higher percentage of these cases who are tubercular than is found in other chronic diseases. We have also found that in a large series of pulmonary tubercular cases there is a low percentage of asthmatics found.

And lastly, that to successfully care for the asthmatic bronchitic case it is usually found that the bronchitis precedes the asthma, and that in its treatment due consideration must be given to the bronchitic features.

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TUMOURS OF THE URINARY BLADDER, DIAGNOSIS AND TREATMENT

E. J. Boardman, M.D.

THE closest scrutiny of the diseases of the body will not reveal one more insidious in its onset and course, or more malignant in its ultimate conclusion than bladder tumour, and this fact should inspire us with a very great desire to make an early diagnosis.

When we consider the symptoms of bladder tumour we are readily conscious of the reason for the obscurity which has veiled these conditions in the past, as we realize, that in the early days of the growth there is often no sympton of any sort, let alone one that is pathognomonic. There is unanimity of opinion among the various writers that haematuria is usually the first symptom. But blood in the urine is also frequently the first symptom noted in renal calculus, renal tuberculosis, renal malignant disease and the essential haematurias; and further, who can say how long the new growth has existed before this symptom made its presence known.

The various other symptoms such as pain, cystitis, obstruction, frequency, urgency, ulceration, necrosis, decomposition of urine, systemic sepsis, etc., are well known to all of us. As we pause, however, to consider them we are soon forced to the conclusion, that any symptom or group of symptoms that may be present with a bladder tumour may also be associated equally well with so many other conditions that an accurate diagnosis by means of the subjective symptoms and clinical findings, at a time early enough to be of much service to the patient, is an absolute impossibility, in by far the great majority of cases. The only clinical finding that may be said to be pathognomonic of this disease is the appearance of shreds of tumour tissue in the voided urine, but unfortunately, while this is not an infrequent occurence, it is usually rather late in the history of the case.

There is not time to enter into the pros and cons of the matter of symptoms, because, when the last word has been said this fact remains, that it is now quite generally admitted that there is no accurate clinical means of determining the source of the blood in a haematuria, the source of the pus in a pyuria, or the underlying cause of many obscure urinary conditions except by the aid of the cystoscope. This being the case, then, neither patient nor surgeon may afford to view with complacency an attack of haematuria, or be satisfied with simply having by treatment controlled the symptoms until every means of ascertaining the underlying cause has been exhausted.

My own opinion is, that a haematuria should be regarded as a very grave sympton; that it ranks in seriousness with acute pain and rigidity in the right lower abdomen; that it positively demands immediate, accurate investigation of its origin and cause by means of the cystoscope, while the patient is still bleeding, because diagnosis, which at that time is usually a comparatively simple matter, is often an impossibility when the attack has passed off.

When one understands that with good technique this instrument reveals abnormalities of the bladder just as plainly as we see pictures on the wall, we are more ready to admit that if such a drastic procedure as exploratory laparotomy is ever justifiable for any cause, then, the least suspicion or suggestion of a bladder tumour warrants and demands a cystoscopic investigation of this viscus, because, by this means we not only diagnose the presence of a tumour, but are able to speak with considerable assurance as to its pathology.

The non-malignant tumour, which is most frequently a papilloma, usually occurs in a bladder otherwise normal, and in so far and in such degree as its environment varies from the normal, just so much is the new growth likely to be malignant in character or undergoing the process of change from the simple to the reverse.

Most of us, however, are not deeply interested in the cystoscopic appearance of bladder tumours, but very briefly it is this, a clean cut villous growth on an otherwise apparently normal bladder wall is usually benign, but if the growth is multiple; if it presents an unhealthy looking, angry red appearance; spreads down onto the adjoining; if in addition, there is a thickened, raised, puffy, nodular, oedematous condition of the bladder wall about the base of the tumour; if there is ulceration, necrosis, or phosphatic encrustation of the surface of the growth itself; in proportion as these different features appear, we can surely diagnose the change from the benign to the malignant.

The diagnosis of the first and the last presents little difficulty, but there are between these two extreme types, many cases which we may term borderline and in regard to which it is not always easy to be positive. In these cases it is possible and sometimes advisable to snip off a piece of the tumour through the operating cystoscope or with the cystoscopic rongeur, for examination by the pathologist. But if this is done it must be carefully borne in mind that the malignant change may begin in any part of the growth; it may begin in the base or in the upper parts of the tumour; it is not a gradual change that affects equally the whole neoplasm at one and the same time, but may for a considerable period involve only a very small segment, perhaps only one villous projection or nodule, and so the section we have been at considerable pains to obtain offers no criterion as to the character of the rest of the growth.

The wisdom of this procedure is therefore doubtful, since there is always the danger of haemorrhage and implantation due to trauma to the new growth and bladder wall. A negative report means nothing, and a positive report will make no difference to the treatment.

In this connection it is interesting to note that while patient and surgeon do not view these conditions from exactly the same angle, still their ideas are parfocal to this extent that the attention of both is called to them only in so much as they menace comfort, health and life, and both are chiefly interested in their complete eradication, where such is a surgical possibility, and failing this in administering such palliative measure as may be deemed advisable. It appears to make no material difference whether the tumour be carcinoma, sarcoma, or benign; the treatment is practically identical in each case.

While these growths may be located at any point in the bladder, the most usual location is about the base. The neighborhood of the ureteric orifices is a very favorable spot, occasionally the trigone, and sometimes the internal meatus. This is both fortunate and unfortunate, fortunate in that it is the most accessible part of the bladder in so far as diagnosis and treatment by means of the cystoscope are concerned, and unfortunate, very unfortunate indeed, in those cases in which for some reason diagnosis and treatment have been too long delayed and ureter, vesicle, or prostate, or all three are involved in a malignancy. These cases are practically all inoperable, and whether we operate or not the prospect is misery,and the future hopeless in most instances.

Treatment—The treatment of malignant disease of the bladder is not more satisfactory than the treatment of similar conditions elsewhere and the deciding factor as to what shall be done in a given case is usually a question of the man and the moment. But the pity of it is that a large percentage of the hopeless cases that present themselves to the surgeon were benign at the beginning, and had attention been paid to their earlier manifestations their treatment would have been a very simple matter.

Radium has been a disappointment in these cases. Those with the greatest experience in its use all voice the opinion that it does not make the least impression on a growth positively malignant. It has, however, been of decided benefit in some cases of an early malignant change in papillomatous growths, some tumours which had not responded to fulguration yielding quite readily to radium or to a combination of radium and fulguration. It has, therefore, an undoubted but limited field of usefulness in this class of tumour. It must be remembered that the effectiveness of radium varies with its distance from the growth to be exposed and that there are difficulties to be encountered in maintaining a direct contact between the radium and the surface of the new growth in the bladder, per urethram. Still these could be and have been overcome when a sufficient amount in the proper form was procurable to make the treatment worth while.

Until very recent years the difficulties of diagnosis have been very great and the attempted surgery on growths sufficiently far advanced to be diagnosed by the subjective symptoms and clinical signs. was not very encouraging. Even in later years surgeons of note have been of the opinion, that tumours of the bladder were best left alone, partly on account of the difficulties encountered at operation and partly on account of the great danger of wide-spread recurrence. Then the discovery was made that villous growths of the bladder lent themselves very readily to transplantation and that little particles of epithelium eroded from either benign or malignant tumors during the course of operation were likely to seed themselves down and form new growths on any part of the bladder mucosa that might be damaged during manipulations. As might be supposed, this made a very great difference to the prognosis in the surgical treatment of this disease, and consequently when steps were taken to eliminate this danger the number of recurrences was markedly reduced. But even with this extra care, simple excision of the growth was not found to be sufficient, and Dr. Geraghty of Baltimore reports that recurrences were three times as frequent after simple excision, as when there was also a resection of the underlying portion of the bladder wall.

Nitze and Casper developed a method of radical removal through the cystoscope by means of the snare and cautery. They secured results far superior to those obtained by the supra-pubic method. But either through lack of skill, experience, or the proper instruments, others were not able to duplicate their results. There was consequently no evidence of very great enthusiasm in regard to this method, and so it happens that until very recently the method of choice in attacking bladder tumours has been supra-pubic cystotomy.

It is now about ten years since Dr. Edwin Beer discovered and developed a method whereby it became possible surely and safely to destroy new growths on the bladder wall by the application of the high frequency current through the cystocope. His discovery may easily rank as one of the most noted in a decade in which noted advances in the field of medicine and surgery were the order of the day. Howard A. Kelly of Baltimore makes this comment, "That Dr. Beer's work has wrought a most welcome transformation in what was previously often a perplexing situation. He has reduced the complex to the category of the simple, always a notable surgical achievement."

Fulguration is the term, which by common consent has been applied to this method of treatment. It has long since passed the experimental stage and, in experienced hands and in selected cases, yields results far superior to that which it is possible to obtain with the knife.

It does away with all the danger, pain,discomfort and inconvenience, contingent upon an open operation on the bladder and makes the removal of a papilloma only a matter of a few sittings in the office.

Statistics show that these conditions are three times as frequent in men as in women, and where the open method requires a more or less serious operation, and from one to four weeks lost time, fulguration requires only an occasional hour during which a general anaesthetic is not necessary, and in most cases the patient suffers very little more inconvenience than is encountered in obtaining a catheterized specimen of urine from the bladder.

Providence has so ordered that by far the greater number of these tumours occupy that portion of the bladder most easily reached through the cystoscope, thus rendering their treatment a comparatively simple procedure.

It has been quite definitely shown that recurrences are more frequent after the open method than after fulguration, sometimes being spread broadcast over the entire mucosa and often occupying positions not easy of access for treatment, should subsequent fulguration be advised. If after fulguration, recurrence does take place, it does not mean another siege in hospital but merely another few minutes treatment on one or two days as the case may require.

In four hundred cases tabulated by Geraghty, Buerger, Von Frisch and Albarran, fifty per cent were classified as benign papillomata, and of the remaining fifty per cent a considerable number were papillary carcinomata, or in other words papillomata, which had undergone malignant change, and these are the type of tumours that respond well to the high frequency spark.

In the face of these facts then I believe there is no excuse for subjecting the unfortunate possessor of a bladder tumour to the dangers and discomforts of an open operation, until fulguration has failed or the cystoscope shows it to be unsuitable for such treatment.

Fulguration is applicable to about fifty per cent of the general run of cases as they are met with from day to day. If earlier diagnosis could be obtained there is good reason to believe that it would be applicable to at least sixty-five per cent. of the total number of bladder growths. In positively cancerous conditions, fulguration has no effect, and the operator is only wasting his time and the patient's chance if he persists in this form of treatment after two or three applications have produced no good results. At present, under existing conditions, if we would do that which is best for our patients, fifty per cent of bladder tumours will be removed trans urethram, and the other fifty per cent, operable or otherwise should be dealt with by the open method.

You have only to witness a large troublesome papilloma rapidly dwindle under the effects of fulguration to be absolutely convinced as to the desirability and efficiency of the method. Its application is so simple and its results so striking that the conversion of the unbeliever is only a matter of a single demonstration.

PREVENTION OF MENTAL BREAKDOWN

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In Manitoba at the present time there are over twelve hundred patients in the three mental hospitals, demanding from the province annually for maintenance alone an expenditure of about half a million dollars. There is also the loss due to the withdrawal of a large number of producers. But the economic burden is not the only side of the question. There is the human side, the mental distress of those unfortunates whose reason has proved unequal to the strain of modern life as well as the suffering of their relatives. Outside these Institutions there is a great host of men and women, who for one reason or another, are unable to adjust themselves properly and who therefore are in reality more or less of a burden on the community. These are the borderline cases who have not and may never reach the stage where it is necessary to deprive them of their liberty. Yet they are mentally ill as truly as are many of the institutional cases. The prevention, therefore, of these conditions of mental breakdown or maladjustment is a problem of great extent and extreme importance.

Absolute prevention is dependent upon full knowledge and absolute control of the causes of mental breakdown. This is beyond our power, but much is known of the causes and over these we have or may have some control and much in the way of prevention may be accomplished by a judicious exercise of this knowledge and power.

Mental breakdowns are due to physical disease, often involving the nervous system directly or indirectly; to bad heredity and to faulty development together with the mental stresses and strains of life. These latter are bound to occur in any civilized community, are likely to vary in proportion to the responsibility thrust upon the individual and are due to the complexity of life. As it is not desirable that individual responsibilities be lessened generally, but rather that the resistance of the individual in general be increased, the reduction of these mental stresses will not be considered as a means of prevention except in the case of those unfortunate individuals known to have a mental equipment of low resistance.

Various acute and chronic infections, organic diseases, head injuries, senile and arteriosclerotic changes, are known to give rise to or strongly predispose to mental disease. Present investigations would indicate that endocrine disturbances play a larger part in mental disease than was formerly thought. On the other hand the mental state profoundly influences the endocrine balance and hence the cause-effect relations of this whole question are still obscure. We have little or no control over some of these medical conditions, such as senility, and hence little can be done with such causes. But the prevention of the causal condition in general results in the prevention of the mental sequela and is therefore to be dealt with as a general medical problem.

Two causes, however, on account of their social importance and as both are preventable, require special consideration. They are alcohol and syphilis. William A. White states that they together "are responsible for fully 20 per cent. of the certifiable psychoses in males at least."(1) Again referring to alcohol, he says: "Recent statistics would indicate that 12 per cent. of the insane confined in public institutions in the United States are there because of its influence, direct or indirect."(2) In some hospitals receiving patients from large cities the proportion of syphilitic psychoses among first admissions is as high as 13 per cent.(3) In Canada generally, because of our smaller cities and large rural population, the percentage falls much below these figures. During the last nine years in the Brandon Hospital for Mental Diseases 8.9 per cent. of the deaths were due to general paralysis of the insane, but so far as can be ascertained from records not over 1.7 per cent. of the admissions were cases of this disease.

The methods of combatting venereal disease and alcoholism have, during the past three or four years, received widespread attention in both the medical and public press and need only be mentioned. The prevention of syphilis depends upon the teaching of young men and young women the advantage and necessity of living clean, continent lives, sublimating adequately sexual energies, and constantly remembering the duty they owe themselves, their fellowmen and posterity. Where these powerful emotions cannot be turned into useful channels, thorough preventive and prophylactic precautions should be taken. Finally early, thorough and prolonged treatment is necessary for those who have been infected. Farquhar Buzzard says that treatment should continue intermittently for the rest of the patient's life.

The experience of the war years may be regarded as pointing the way to the prevention of the psychoses due to alcohol. During the year 1916 and since, there has been a marked falling off in the admissions to the Brandon Hospital for mental diseases. This has been attributed in part to the diminution in the use of alcohol as a result of war measures. Only two cases of alcoholic psychoses were admitted to this hospital during 1920. The contrast between this and the corresponding admissions in a country where the same restrictions regarding alcohol do not obtain is very striking.

Kirby(4) has shown that in the New York State Hospitals there has been a falling off of cases of alcoholic psychoses among the first admissions from 10.7 per cent. in 1909 to 1.8 per cent. in 1920. He indicates that this is due to the great trend of public opinion against the use of alcohol that has been growing during the last fifteen years, and which has culminated in prohibition measures.

Certainly, so far as the problems of mental disease are concerned, prohibition deserves an extended trial.

Faulty or tainted heredity has been variously regarded as bearing an important causal relation to mental disease in from 60 per cent. to 70 per cent. of cases admitted to mental hospitals. In these conclusions true hereditary tendencies and developmental factors have doubtless not been fully differentiated. Three groups of factors are likely to be confused: Tainted heredity in the true sense, that is, abnormal tendencies due to defective germ plasm; germ plasm damage occurring at the time of, just previous to, or after conception, through alcoholism or the toxic effects of chronic debilitating disease; and developmental factors, or as Adolph Meyers expresses it: "Early growth and nutrition" on the physical side, and "training and habit formation" on the mental side.

Prevention in relation to heredity is largely a question of marriage. Marriage is a much more serious question for future generations than those contemplating it appear to recognize. The personal or selfish aspect is unduly emphasized. The raison d'etre of marriage is the propagation of the species, and young men and women should have their ideals so developed that only mates healthy in mind and body would normally be chosen. While the ideal is, of course, that both individuals should be healthy mentally and physically, that is seldom attainable, and in reality the limits of marriageability are not so narrow as many eugenists would have us believe. It has been found that the prospect of healthy progency from the mating of tainted with untainted or even with slightly tainted stock is good, and the number of those mentally unstable is much less than the number of those mentally sound and the value of the latter to the world much outweighs the loss on account of the care and protection required by the former.

Individual tendencies depend upon hereditary, conceptional and developmental influences and where there are slightly unfavorable hereditary influences they may be neutralized to some extent by taking special precautions to provide good conceptional and developmental influences. Where these unfavorable conditions obtain, therefore, the facts should be frankly faced by those contemplating matrimony, so that special attention may be directed to the other factors.

It is difficult to formulate sounder advice than that outlined by Adolph Meyers. (5)The reader is referred to Meyers' article for a full discussion.) He says that if two individuals "can feel and give to their own sense and conscience reasonable assurance of giving a family of four children a wholesome, healthy environment and education, then even tainted persons might be allowed to marry, especially into untainted stock." He further adds: "If unfavorable heredity should crop out, it would be highly probable that the healthy and capable brothers and sisters would be able to assure the protection and care of the problematic abnormal individual.

From a practical standpoint one may say that marriage should be prohibited:

1. Where either the man or the woman has had a mental breakdown.

2. Where one or both have marked psychopathic tendencies.

3. In the case of all mental defectives, except the higher grades of the moron class and even then when psychopathic tendencies are present.

One is sometimes asked if a marriage without children is permissable, that is, where conception is prevented by continence or contraceptive measures. In all cases where one only of the contracting parties is abnormal such a marriage should be forbidden. It is unjust to the normal individual. Theoretically, in certain circumstances it might be permitted between two psychopathic individuals or where the stock was tainted on both sides, but then only with full knowledge of the responsibilities involved. Where one of a couple already married has had a breakdown no subsequent conceptions should be allowed to take place.

A compulsory medical examination of both parties before marriage has been advocated, and, I believe, has actually been provided for by statute in certain States, but is of doubtful value, as unscrupulous examiners could always be found to sign the necessary documents. A simple physical examination is of no great value, in itself, except to rule out active venereal disease. A thorough evaluation by a medical expert, voluntarily obtained by the contracting parties and involving a consideration of ancestry, mental, attributes and physical condition would, however, be of the greatest value. It would enable the two individuals to assume their new responsibilities with important knowledge of possible facts likely to affect adversely the resulting progeny and thus to be prepared to neutralize, in so far as possible, undesirable tendencies.

Sterilization of those who have had a mental breakdown and of mental defectives has been frequently mooted, but is of doubtful value and in many cases would not be advisable. It might with wisdom be recommended in certain individuals, mainly of the feebleminded groups, viz., 1. All imbeciles and some low grade morons. 2. All morons with antisocial or marked sexual tendencies. 3. A few psychopathic individuals especially those with hypersexual tendencies.

So important are developmental influences, that is, early growth and nutrition and training and habit formation, that William A. White has refered to childhood as "The Golden Period of Mental Hygiene." Even, with a tainted hereditary much can be done during this impressionable period to neutralize unfavorable tendencies and to create healthy habits of thought. Like Demosthenes, the individual may not only surmount his obstacles but actually achieve greater success because of them.

The moulding of the child's environment should begin before birth, and even before conception, in the teaching of mothercraft and fathercraft to young women and young men so that they may be prepared to intelligently assume the responsibilities of parenthood. The importance of good health on the part of both parents at the time of conception should be emphasized.

The importance of attending to the child's physical health is generally appreciated, but not so the importance of ensuring good mental habits.

Mentally, each individual may be said to have inherited three fundamental instincts or emotions which are the mainsprings of life, the forces which carry the individual through the world. They are: The self-preservation instinct, the race-preservation instinct, and the herd instinct. Manifestations of the first are hunger and fear. It compels the individual to provide for his nutrition and to protect himself from his environment. It is pre-eminently selfish and direct in its operation. The second, in its narrow sense, is manifested by the desire for sexual gratification; in its wider sense it gives rise to the great emotions of maternal and paternal love, filial love and friendship. It is essentially indirect and altruistic. The third may be regarded as a derivative of the other two emotions and enables us to live in communities as social beings. These emotions demand satisfaction and their energies ordinarily find outlet in a healthy way directly or indirectly by sublimation. They will otherwise be repressed and hence find outlet in unhealthy ways. The great purpose of training and habit formation, that is, of education in a broad sense, is to enable the individual to control these emotions wisely and to use their vast energies in a healthy way, to enable him to boldly face and efficiently control his environment and not to allow his energies to be dissipated in useless fantasy.

The great laboratory for this developmental work lies in the home. Nowhere else does one find work done from truly altruistic motives. There it is performed in response to the dictates of the race-preservation instinct. In general, work is elsewhere done by virtue of the self-preservation instinct which is essentially selfish. Therefore, any action of the State that transfers fundamental responsibilities from the home to the state or reduces the influence of the home is pernicious. Therein lies the fallacy of the theories of such socialists as Ellen Keyes who preach state reared children. No matter how lowly or how bad the home there is almost invariably a spark of mother love to exert its influence on the young from birth onward. Anything the State can do to shield that spark and to fan it into a flame is of value. The preservation of the home is of fundamental importance to the race.

Our school system in the past has emphasized intellectual development and has shown a tendency to rob the home of some of its importance. That attitude is changing to some extent, and now the school is trying to supplement and not supplant the home. By the development of playground facilities and of manual training and domestic science it is emphasizing the emotional and volitional as well as the intellectual. Children can learn to control themselves more by surmounting physical difficulties than by achieving intellectual successes. The young man or woman who has learned to play a game cleanly, honestly, and to the best of his ability is likely to play the game of life in the same way.

The training of a child should begin the day of its birth. The unborn child may be said to be omnipotent. Everything is done for it and all its desires are satisfied. The infant is less so, but still its exertions are confined to breathing, suckling, defaecation and urination, which are semi-automatic acts. Later, it learns to cry when it is hungry and then to reach out or creep toward and grasp whatever it wants. It is learning to overcome its environment. Year after year the individual's desires become more numerous and more complex and the satisfaction of these desires more difficult to obtain and more removed in point of time until we find the adult striving for the satisfaction of his own needs and desires and for those of his family, a satisfaction that may not be attainable for years, or that may even be problematical.

At each stage of development a more efficient mode of reaction is normally adopted. But abnormally less efficient modes may become fixed and carried on. This produces a maladjustment to environment and may be one of the factors causing a mental breakdown in adult years. For example, we find a spoiled child flying into a temper and crying for things he should be striving for and we find the adult wasting his energies in useless fantasy and sensitive seclusion instead of actively and fearlessly forcing his environment to yield him the reward he desires.

It is the duty of parents and others to foster in children correct mental habits so that these developmental milestones may be successfully passed. The more youthful methods of adjustment must be discarded at the proper time for more efficient and mature. In this way the young man and the young woman may be prepared for the struggle of life with the proper mental equipment for adequate adjustment.

The developmental period is not without its special problems, with which all having the responsibility of children should be familiar

There is first the abnormal child, the neurotic or psychopathic child. He is often said to be "highly strung." He may be timid, sensitive and seclusive. He may be excitable, violent tempered, or subject to terrifying dreams. Such a child requires exceptional care and deep sympathy. It is essential that the parents face frankly the abnormal tendencies. We so often try to conceal even from ourselves these tendencies in our own children. This attitude is an unfortunate attitude and only robs the child of much needed assistance. In such a case the objective interests must be developed and the physical rather than the intellectual activities emphasized. For him outdoor life, outdoor games and outdoor work are essential. These children are often extremely sensitive, especially to ridicule and censure, and tend to become morbidly seclusive. Intelligent sympathy and encouragement are necessary to counteract this dangerous tendency. With care not only can the danger of a subsequent mental breakdown be avoided, but frequently this type of child may be developed into the highest type of citizen.

Certain developmental periods require special care. They are the periods of infancy, of puberty and adolescence. The importance of laying good foundations in infancy has already been emphasized.

Puberty and early adolescence is a period of many dangerous reefs. During it various conflicts arise between the established ideals and the newly awakened sexual emotions. Both boys and girls require special guidance. The interests should be largely objective. Hard study should be avoided, especially in girls who seem apt to become unduly ambitious at this time. Excessive fantasy-habits during this period are easily formed. Day dreaming is especially characteristic of this period and is, within limits, normal, but should be outgrown to a great extent as adolescence progresses. If the individual is seclusive, and healthy external interests have not been developed, this normal reaction of youth becomes fixed as a bad habit in the adult and prevents effective adjustment.

The third great problem is the teaching of the knowledge and meaning of sex. Sexual activities and interests are the manifestations of one of the fundamental emotions, an emotion that is bound to have some outlet direct or indirect, normal or abnormal. About it occur many conflicts and, without care, many dangerous repressions. All are agreed that young men and women should possess some knowledge of their instinctive natures, and that this knowledge should come through clean channels. The question is, when shall the child be taught and by whom?

We are told by some educators that it may be taught in school and if taught as any other branch of knowledge no undue curiosity will be aroused. They tell us that the morbid curiosity is due to our conspiracy of silence. This, I believe to be incorrect. Sexual curiosity is no ordinary curiosity. It is an interest surcharged with emotion dependent on the activities of an instinct no less powerful than the self-preservation instinct, and because less direct in its action more powerful in its interest. No matter when or where sex knowledge is taught one runs the risk of awakening untimely emotions and fancies, or of overstimulating those awakened. As the child's interest normally and spontaneously awakens, so should his desire for knowledge be slowly and tactfully satisfied. In other words, when he asks questions these may be simply and frankly answered in so far as his understanding will permit.

Under these conditions none but the parents are in a position to impart information regarding sex, and it is from the parents that it should always come. In cases where they feel themselves incompetent, they might presumably refer the child to some trusted and respected friend, such as, physician, teacher or other person. In the school may be taught the facts of biology with reference to plants and lower animals, but not all the facts of human physiology. Moreover, the child must have received the rudiments of his knowledge before he is old enough to study biology in school or his playmates will have forestalled the teacher.

Once well past the age of puberty young men and young women may be taught the facts of sex and the prinicples of fathercraft and mothercraft with profit by special teachers in our high schools, especially if the elementary facts have been properly learned in childhood.

Developmentally then the prevention of a mental breakdown depends on the development of a healthy body and a healthy mind, i.e., the rearing and training of individuals who have learned to control themselves and their environment.

From a national and a social standpoint the prevention of mental disease involves the exclusion of immigrants whose capacity for mental adjustment is low. During the last nine years 65.05 per cent. of patients admitted to the Brandon Hospital for mental diseases were born outside of Canada, though at the time of the last census (1911) only 41.87 per cent. of the population of Manitoba were born outside of Canada. From 1912 to 1915, the proportion of non-Canadian born was almost constant, at about 70 per cent. Since 1916 the cessation of immigration due to the War has had an effect, and the percentage of foreign born admitted has steadily decreased, though it is even yet too high. The conclusions are obvious. Stringent regulations are required to prevent those physically and mentally unfit from entering or becoming citizens of Canada.

The prevention of mental breakdown, so far as our present knowledge and control permits, is to be attained by active steps in four main directions:

1. Medical and Social. By the adequate prevention and treatment of alcoholism and syphilis.

2. Heredity. By steps to prevent the bringing into the world of individuals likely to have a mental breakdown. This may be attained to some extent by contraceptive measures, and possibly, in certain cases, by sterilization, but chiefly by building up high social ideals and a strong and enlightened public opinion, and by emphasizing the true object of matrimony.

3. Developmental. Ensure for each child a healthy body. Develop in each individual healthy habits of thought and objective interests, taking care that more youthful or inefficient modes of adjustment do not become fixed. Balance properly the child's physical and mental activities. Face frankly and take steps to counteract abnormal tendencies in the child. Open out the child with a sensitive and "shut-in" personality. Teach the psychopathic or neurotic child to control himself. Guide the boy and the girl through the troublesome period of puberty. Sex knowledge should be imparted to the child in the home by the parents as it is spontaneously demanded.

4. Immigration. Wise and well enforced immigration laws are required.

Today, as was the case with tuberculosis twenty years ago, the problems of mental disease are viewed with pessimism by the majority of the medical profession, but this attitude is changing and within a few years will, as in the case of tuberculosis, be replaced by a healthy optimism. In both tuberculosis and mental disease, however, prevention is better than cure.

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LATENCY IN SYPHILIS

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At the "All American Conference on Venereal Diseases" held in Washington in December last, the following conclusion with regard to the Wassermann reaction was unanimously reached:

1. "That a frank, reliable, positive Wassermann should be regarded as a symptom of syphilis.

CAUTION—(a) In the absence of all other evidences of syphilis, a diagnosis of syphilis upon a positive Wassermann reaction alone should be made with great caution.

(b) In the absence of all other evidences of syphilis the Wassermann result should be verified by several repetitions at the hands of different observers, if possible. The presence of other conditions which might cause a positive Wasserman should be excluded as far as possible.

(c) There should be a very careful search for other evidences of syphilis, including clinical, serologic, pathologic, and other examinations.

CONCLUSION—After all of the above conditions have been complied with, a positive Wassermann should be assumed to be evidence of the existence of syphilis."

"IT WAS FURTHER RESOLVED: That the negative Wassermann reaction should be interpreted in terms of the following limitations and conditions:

(A) "In differential diagnosis of Syphilis, a negative blood Wassermann test cannot be regarded as evidence of the absence of the disease.

(B) "In the early primary stage of Syphilis, the blood Wassermann test is expected to be negative.

(C) "In the active secondary stage, a repeated negative blood Wassermann test is a rare occurrence, and should be accepted only after a very careful examination of the case.

(D) "In all forms of late Syphilis, especially in those which have been treated, and in women in whom the disease may be otherwise symptomless, it is not uncommon to meet with a negative Wassermann reaction, and too much importance should not be attached to such a finding in suspected cases.

(E) "For purposes of diagnosis, attention should be drawn to the importance of recognizing by repeated tests, the transmission from the negative to the positive blood Wassermann in primary stages of the disease.

2. "A Wassermann test should be applied

in every case in which there is any suspicion of syphilis, but the positive or negative outcome of the test should be interpreted in the terms of the clinical picture the case presents.

"The so-called routine Wassermann test, while a valuable aid in diagnosis, should not be used as a substitute for general clinical examination."

A positive reaction carried out in accordance with the conditions named, even though there be no clinical signs of disease, need cause us no uneasiness as we can accept its presence as evidence of disease, and treat accordingly.

A persistently negative reaction, in the absence of clinical evidence of disease, may mean that the disease is cured, or has become latent, and it is our inability to decide definitely which of these two states has resulted, that may cause us some uneasiness. Symmers, Darlington and Bittman found that in 31.56 per cent. the Wassermann was negative, according to the antigen employed, in cases which showed characteristic syphilitic lesions at autopsy.

It is customary to make use of a provocative injection of neo-salvarsan in order to determine whether the negative Wassermann means that the disease is cured, or is merely latent.

The observations of Strickler, Musson and Sidlick, that intravenous injections of salvarsan in non-syphilitic patients with a previously negative Wassermann reaction, are followed in more than half the cases by a positive reaction, would indicate that the results of provocative doses are questionable. Umbert has given us seven postulates of cure, viz., time elapsed; interval between infection and treatment; the sum total of clinical manifestations of the disease; nature of treatment; the last manifestation of the disease; the state of the patient's health; and a series of negative Wassermann reactions carried over a long period of time. These seven factors are useful but are not absolute.

We base our cure of syphilis roughly on absence of clinical signs and a series of negative Wassermann reactions.

If it is true that a negative Wasserman means practically nothing, and it would appear to be so, for it is found that the Wassermann reaction may be negative while the Treponema pallidum can be found in patches on the mucous membranes and even grown from the blood, then one of the hypotheses on which we base a cure is weak.

Notwithstanding the fact that a series of negative Wassermann reactions and complete absence of clinical signs is presumptive of cure, we should hesitate before making the assertion. It is undoubtedly true that we can cure syphilis before the stage of generalization is reached, and probably true as well after the stage of generalization, provided that treatment is carried out over a very long period of time, but just when we can pronounce a cure is a difficult thing to say.

In spite of our comprehensive knowledge of the disease, the annual death rate from syphilis in Germany is 60,000 and in France 30,000. The great majority of these cases have been treated, and undoubtedly many believed themselves cured. In this respect we do not appear to be much further advanced than we were before the advent of the arsenicals, and the Wassermann reaction. Nothing is more disheartening than to find the patient who has been cured return with a recurrence.

There is a vast difference between latency and cure, and one full of possibilities for the patient. Wrapped up in the word latency is the key to the cure of syphilis. When we know what is happening during that critical period, we will know when to pronounce the fatal word cure. We will also have a clearer understanding of the value of our therapeutic agents, and will be able to handle them to better effect.

Our present armamentarium consists of 1st. A knowledge of the Treponema pallidum outside the body. 2nd. Arsenicals, mercury, and iodides for treatment. 3rd. The Wasserman reaction for diagnosis and control of treatment. We need in addition, a full and complete understanding of latency. This promises a full and complete understanding of the life history of the Treponema pallidum within the body.

We know that during the stage of generalization the blood swarms with the organisms which, after a variable length of time, even without treatment, disappear from the blood and a period of latency begins.

To what is this disappearance from the blood due? Is it due to the immunological forces of the blood, phagocytosis, bacteriolysis, etc., which kill off great numbers of the organism, or is it due to the passage of the organism into a resting stage—spore formation—or is it some measure due to both?

It has been shown that the points at which the spirochaetes tend to accumulate in greatest numbers are the perivascular lymphatics.

Brown and Pearce have removed the lymph nodes from rabbits which were in the latent stage of syphilis—latent from three to six months—and by inoculating healthy rabbits with an emulsion prepared from these lymph nodes, were able in every instance to reproduce the disease. In every instance that an examination was made for the Treponema pallidum in the lymph nodes the results were negative. From these experiments it would appear that the Treponema pallidum exists in these lymph nodes during the period of latency in a form unknown to us, and given a congenial environment is capable of reproducing the disease.

These experiments would appear to indicate an ability on the part of the Treponema pallidum to enter into a resting or spore existence. In this connection the question that must naturally strike us is why the organism, in whatsoever form it exists in the lymph nodes, is unable to develop in the blood of the host? Undoubtedly it is due to an unfavourable environment which is the result of the serological forces of the body or, in the case of treatment, the therapeutic agents which we employ. Anthrax spores will develop only in the presence of oxygen.

Very few organisms in nature when subjected to deleterious influences completely die out. In unfavourable surroundings the organism develops a resistance which may be made manifest in various ways of which, as far as we know, the spore is the commonest. Our arsenical and mercurial preparations render the environmental conditions unfavourable to the existence of the Treponema pallidum.

Reproduction in the case of the Treponema pallidum is chiefly by longitudinal division. Transverse division, it is claimed by some observers, also takes place. If these observers are right, there must be here a fundamental difference in the end product of these two methods of division. Does each half of the transverse division represent a resistant form of the organism—a spore? Male and female gametes and sexual reproduction by conjugation, encystment and spore formation have been described, and it is believed by some that the spores which are produced may be carried by the blood to distant parts where they develop under favourable conditions into treponemata.

We have here a condition analagous to malaria in which we find the female macrogametocyte, male microgametocyte and the neutral schizont.

There is this difference, that in the case of the Treponema pallidum conjugation between the male and female elements, it is said, takes place within the body of the host, whereas in the case of malaria conjugation takes place in the female mosquito.

In the body of the malarial host the microgametocytes die off, and the macrogametocytes are very resistant and remain in the body for a long time, until for some cause the resistance of the body is lowered, when they become active and develop merozoites by parthenogenesis which invade the red corpuscles and start the process anew. Is there a similar process in syphilis? In trypanosomiasis the multiplication of the trypanosome is by longitudinal division, but it may also take place by schizogony-asexual sporulation. At first Schaudinn thought that the spirochaete was allied to the trypanosome, but later on changed his views.

When we say that the disease is latent, do we mean simply that the patient has become a carrier. In other words do the Treponema pallidum and the immunological forces of the body declare a truce during this period of latency, and enter into a commensal existence?

May we believe that after a period of struggle this takes place, and the future of the patient will depend on the disturbance or maintenance of that truce?

The fact that the period of latency is usually longer in those who live a regular life and shortened in those who give way to excesses would point that way. Anything which tends to lower the resistance in malaria will cause a relapse. Alcoholism is a common concomitant of aneurysm and degenerative encephalitis. A point of importance is whether or not the disease is latent in the sense of inactive. It would seem more rational to believe that this is in reality not a period of passive waiting on the part of the Treponema pallidum, but one of activity during which the organism is endeavouring to multiply and overcome unfavourable conditions. In all probability it is a period of activity on the part of the organism and the immunological forces of the body, for it is inconceivable that an organism can invade the blood without stimulating activity on the part of the protective forces of the body.

In all diseases there is a fight to a finish in which either the causative organisms or the body cells are victorious. We have examples of this in such diseases as: typhoid, scarlet fever, diphtheria, plague, cholera, etc. The patient may become a carrier after the disease is at an end, but he never suffers a recurrence. In trypanosomiasis the disease is invariably the victor. In malaria and syphilis there are recurrences over a period of many years, and it is difficult to believe that these recurrences are merely a disturbance of the commensal state which has resulted after a long period of struggle. One is justified in believing that the immunological forces of the body are constantly inhibiting the growth and development of the organisms, and that those organisms which do develop during the period of latency, are taken up and destroyed by the body cells. The latent period would seem to be a time of constant activity and any lowering of the vitality of the host, throws the balance in favour of the Treponema pallidum with a resultant recurrence.

Once the Treponema pallidum has invaded the blood and the disease becomes generalized, its complete eradication becomes a doubtful matter. After this period it would appear that at best, our therapeutic agents only aid the body cells in preventing the further development of the Treponemata and the balance is in favour of prolongation of the latent period.

No doubt the fixed cells of the body play a part coequal with the cells of the blood in preventing the development of the organism.

During the time of latency in which the struggle is going on between the disease and the body, there is little, if any, pathological change, and the Wassermann reaction is negative. It is only when the organism begins to gain the upper hand that the Wassermann becomes once more positive and the disease is said to recur. The negative Wassermann obtained under these conditions is of no value, but on the contrary may lead to erroneous conclusions. Further advances will depend in a great measure on our understanding of what is taking place during the period of latency and exhaustive studies of the pathological and serological activities of this period are greatly needed.

COD-LIVER OIL WITHOUT PHOSPHORUS AS EFFECTIVE AS COD-LIVER OIL WITH PHOSPHORUS IN RICKETS AND TETANY*

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SINCE Kassowitz's (1) work on the influence of cod-liver oil and phosphorus on the calcium retention in rickets, physicians have universally employed this combination in the cure of rickets. Kassowitz believed that it was the phosphorus in this mixture that was effective and that the cod-liver oil was inert.

Later, Schabad (2) found, by metabolism observations, that there was a lessened retention of calcium and phosphorus in rickets.

To obtain a phosphorus retention, he added oil of phosphorus to the cod-liver oil. He tried oil of phorphorus with other oils, as olive oil, but could not obtain with these, uniform calcium retention. He noted that cod-liver oil alone had a significant effect, but ascribed a superiority to the combination of cod-liver oil and phosphorus.

Rosenstern (3) with many years of clinical observations, believes that the phosphorus is of no value, but that a greater amount of cod-liver oil must be given than of cod-liver oil and phosphorus.

Schloss (4) working after Schabad, thinks that the latter is not justified in his conclusions regarding the superiority of cod-liver oil and phosphorus over cod-liver oil. Schloss believes that it is the calcium intake that is most important, and that without sufficient calcium intake, cod-liver oil and phosphorus will not be of any use. If the calcium content of the food is not adequate, and a calcium compound such as acetate is given, the cod-liver oil and phosphorus will cause the calcium to be incorporated in the organism. He considers this to be the case in breast-fed infants and rickets. These cases have a low calcium intake, and Schloss believes that they are not improved until calcium acetate is given in addition to the cod-liver oil and phosphorus.

From several hundred clinical observations, Schloss (5) concludes that the cod-liver oil has as great an effect on rachitic metabolism as cod-liver oil and phosphorus. For three years he has not used the phosphorus combination, even in cases of tetany, and has had as good results without it. He still believes that in breast-fed infants when the calcium content of the food is below normal, a cure can be effected by adding calcium, and omitting cod-liver oil. He does not seem to have tried adding calcium to artifical food when it was deficient, but his observations were on breast-fed infants that were given extra calcium.

Analysis of the milk of mothers with rachitic children shows that sometimes at least, the calcium content is normal. Holt and Courtney (6) have done considerable metabolism work on rachitic children, and have found a definite loss of calcium during florid rickets, and a gradual increase in the retention during healing, until the normal balance coincides with recovery. Their figures show that in rickets there is an abnormal loss of fat and calcium due to the large amount of feces excreted, although the percentage of fat and calcium in the stool does not vary materially from the normal. Holt and colleagues' analysis show 0.0458 gm. calcium in 100 c.c. mature breast milk, and as a low limit 0.1692 gm. calcium in 100 c.c. cow's milk. Thus the amount of calcium in cow's milk is 3.5 to 4 times that of breast milk.

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Hence any ordinary whole milk and water feeding would necessarily contain sufficient calcium; only a high top-milk dilution would give too low calcium.

These investigators have further shown that there is a better percentage absorption of calcium in breast-fed infants, than bottle-fed, and in addition, that there should be a certain fat intake for the best retention of calcium. This relation should be from 0.045 to 0.060 gm. calcium per kilo and 4.0 gm. fat per kilo of body weight to give the optimum effect of calcium retention. In considering the fat intake, one should remember that the cod-liver oil will augment the diet, as a teaspoonful weighs 5 gm. and is about 100 per cent. fat.

There does seem, however, to be some other factor to be considered besides an adequate calcium and fat intake, for calcium storage. Osborne and Mendel (7) have found that cod-liver oil contains a high percentage of the growth element "fat-soluble A" and this constituent seems to us to be essential for the normal storage of calcium.

With sufficient calcium and fat in the diet, supplemented by the cod-liver oil, containing a large percentage of "fat-soluble A" there should be ideal conditions for the absorption of calcium and its incorporation in the tissues.

In a previous paper (8) by the authors, it was shown that cod-liver oil and phosphorus produces an increase in the blood calcium with a corresponding reduction in the mechanical and electrical signs of Tetany within a period of ten to seventeen days. Our present study consisted in observations conducted along somewhat similar lines to determine whether or not the phosphorus contained in the cod-liver oil was of any benefit in effecting a cure of either rickets or tetany. As stated in our last paper, we consider that all cases of tetany show signs of rickets in varying degree. We have used cases of tetany intentionally, as it is possible to estimate the progress in these cases more accurately than in uncomplicated rickets—e. g. by means of the galvanic battery, and the presence of the mechanical signs of tetany.

CASE REPORTS

N.B.—In every instance the children were fed rational amounts of milk and water with added carbohydrate.

Case 1.

1. B.—Age 6 months.—Admitted Jan. 13th. The patient had been breast-fed for 3 months, then Allenbury's food was given for 1½ months. Following this boiled milk and water formulae were given until admission.

Patient was brought to the hospital on account of many convulsions during the week previous to admission.

On physical examination the child was found to have some parietal bossing and a slight rachitic rosary, was very irritable, showed very marked laryngospasm, carpopedal spasm, and definite Trousseau's and Chvostek's signs. The electrical irritability was very much increased.

On Jan. 16th, plain cod-liver oil without phosphorus was begun in 20 minim doses, three times a day. On Jan. 19th, the calcium content of the blood was 6.6 mg. per 100 c.c. The mechanical irritability began to decrease about Jan. 30th, but did not disappear until Feb. 8th. The electrical irritability began to decrease on Feb. 3rd, and became normal on Feb. 11th. The blood calcium showed a definite increase on Feb. 4th, and reached normal point on Feb. 16th. At this date observations were discontinued, but

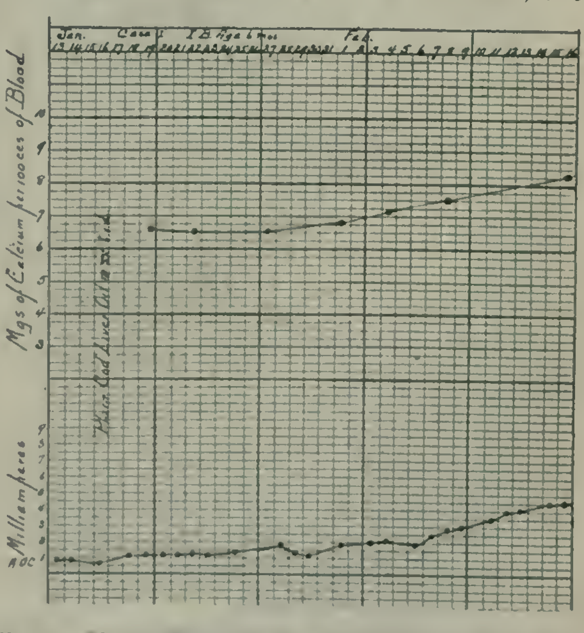

Fig. 1. Shows the gradual reduction (lower line) in Case 1 in the electrical irritability under the influence of cod-liver oil without phosphorus. The upper line shows the gradual increase in blood calcium.

the same amount of cod-liver oil was continued throughout the child's stay in the hospital.

Case 2.

R.B.—Age 3 months.—Weight 7¾ lbs.—Admitted Jan. 20th.—Discharged Mar. 13th.

This child had been nursed for 1½ months, with a supplementary feeding of milk and barley water for the last two weeks of breast feeding. Following this and until three days previous to admission she was fed Nestle's food, then a milk, water and sugar formula.

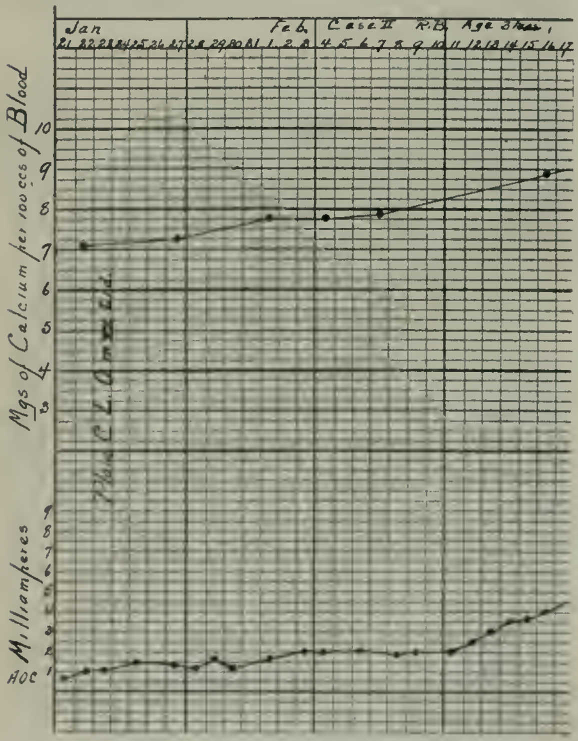

Fig. 2 (Case 2) shows as in Case 1 the gradual reduction of electrical irritability coincidently with an increase in the blood calcium.

The patient was brought to the hospital on account of three convulsions occuring on the date of admission.

Examination—Craniotabes present, no enlargement of the epiphyses and no bossing present. Trousseau's signs and Chvostek's both present, carpopedal and laryngeal spasm not observed. Electrical irritability very much increased. These positive signs were not very pronounced

On Jan. 23rd, the administration of plain cod-liver oil 20 minims, three times daily was started. At this time the calcium content of the blood was 7.1 mg. per 100 c.c. The electrical irritability, the mechanical signs of tetany and the calcium of the blood remained about the same with the same dosage of plain cod-liver oil until Feb. 9th. From this date until Feb. 15th, the signs began to disappear gradually, no tetanoid signs remained, and the blood calcium had reached 8.9 mg. per 100 c.c.

Case 3.

M.G.—Age 9½ months.—Weight 11½ lbs.—Admitted Jan. 29th.—Discharged Mar. 25th.

This child had been breast-fed for two months, then given a milk, water and sugar formula, unboiled, for 7 months, and finally for two weeks previous to admission had had a sterilized, 3 per cent. dairy modification.

The infant was brought to the hospital because of frequent convulsions with very marked laryngospasm during the previous six weeks.

On examination it showed slight epiphyseal enlargement and parietal bossing, very marked Trousseau's and Chvostek's signs, with carpopedal and laryngeal spasm. Electrical irritability was quite diagnostic.

On Feb. 3rd plain cod-liver oil 20 minims, three times daily was begun; at this juncture the calcium content of the blood was 6.3 mg.

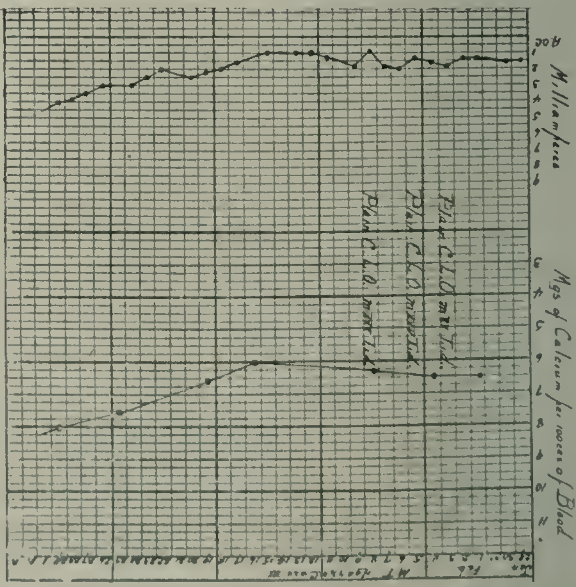

Fig. 3 (Case 3) shows at first a gradual decrease in blood calcium during the first two weeks followed by a gradual increase with a corresponding reduction the electrical reactions.

per 100 c.c. of blood. On Feb. 5th, child had several convulsions—plain cod-liver oil was increased to 25 minims, three times daily. On Feb. 8th, the calcium content of the blood was 6.3 mg. and electrical irritability still quite marked. On Feb. 10th plain cod-liver oil was increased to 30 minims, three times daily. Electrical irritability remained about the same until about Feb. 20th, when it began to decrease. The calcium content of the blood began to increase about this time with a lessening of the mechanical signs: by Feb. 29th all mechanical, electrical and chemical signs of tetany had disappeared and observations were stopped.

Case 4.

1.H.—Age 10 months.—Admitted Feb. 21st.

This child had been nursed for 4 months, she was then fed on condensed milk until 4 days before admission, when she was given a milk, water and sugar formula.

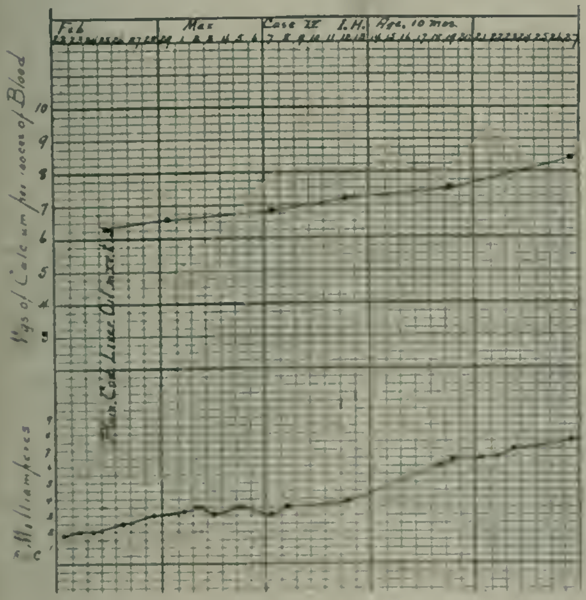

Fig. 4 (Case 4) shows the gradual reduction of electrical irritability with a corresponding increase in the blood calcium under the influence of plain cod-liver oil.

During two days previous to admission the patient had had 6 convulsions and had been making "crowing noise" when breathing.

On physical examination the infant showed very marked signs of rickets, enlarged epiphyses, frontal and parietal bossing, rachitic rosary and sulcus. There were, in addition very marked mechanical signs of tetany, viz.: Chvostek's and Trousseau's signs, carpopedal and laryngeal spasm. Definite electrical irritability and decreased calcium content of the blood.

On Feb. 25th plain cod-liver oil was begun in 15 drop doses, three times a day. There was no very definite change in the findings until about March 12th, when the mechanical signs became less marked and the electrical irritability became much reduced. The calcium of the blood also increased from 6.7 mg. to 7.2 mg. per 100 c.c. of blood. On March 19th there were no more mechanical signs and no abnormal electrical irritability. Observations were continued until March 27th at which time the calcium content of the blood had increased to 8.4 mg. per 100 c.c.

Case 5.

E.G.—Age 7 months.—Admitted Feb. 25th.—Discharged Mar. 27th.

The child was brought to the hospital on account of "choking spells" during the previous four days.

Patient had been breast-fed for one month and from that time until admission has had boiled milk, water and sugar formula.

On examination, the child was found to

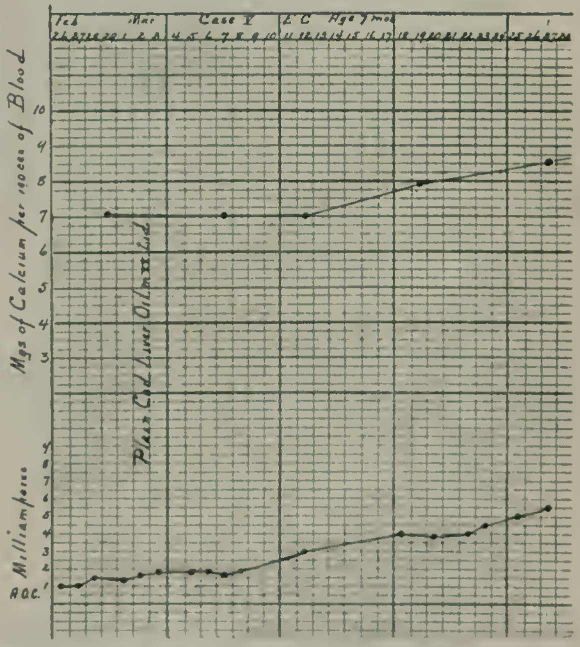

Fig. 5 (Case 5) shows a stationary blood calcium for the first two weeks followed by a gradual increase coinciding with a reduction in the electrical signs.

have marked frontal and parietal bossing and definite rachitic rosary. Chvostek's and Trousseau's signs were easily elicited, there was very marked laryngospasm and some pedal spasm. Electrical irritability was much increased and the calcium content of the blood moderately reduced.

The administration of plain cod-liver oil 20 minims, three times daily, was commenced on March 2nd, and continued throughout the period of observation. There was no definite change until about March 12th, when all findings began to approach normal. About March 22nd, the mechanical and electrical signs had disappeared and the calcium content of the blood had increased to 7.9 mg. per 100 c.c. Observations were continued until March 27th, the calcium of the blood at this date had increased to 8.4 mg. per 100 c.c.

Case 6.

W.H.—Age 4 months.—Admitted March 18th.—Discharged April 24th.

The patient was brought to the hospital because he had had a convulsion on the previous day. He had always been troubled with constipation and vomiting. The mother described a "croupy" cough which he had had for one month prior to admission, but this was never heard while on the wards.

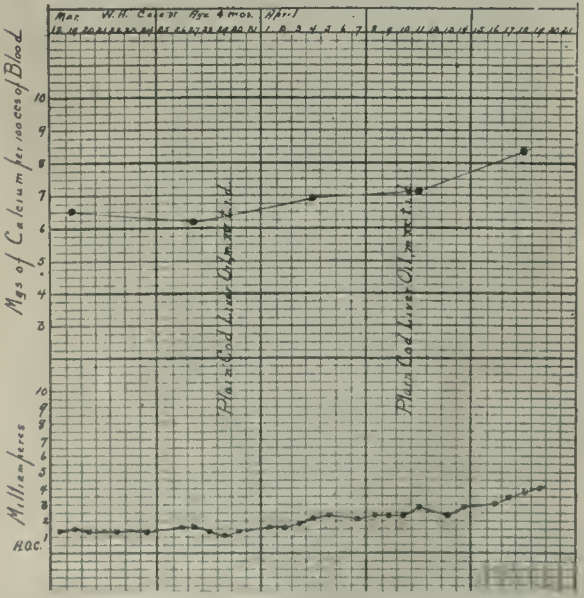

Fig. 6 (Case 6) shows gradual reduction of the electrical irritability coinciding with an increase in the blood calcium.

The previous feeding had almost entirely consisted of patent foods without the administration of any oil or orange juice.

On physical examination, there was definite cranio-tabes, rachitic rosary, and flaring of the ribs at the costal margin. Chvostek's and Trousseau's signs were both present and there was quite marked electrical irritability with decreased calcium content of the blood. The administration of plain cod-liver oil was not begun until March 29th, when 15 minims, were given three times a day. At this time all the signs had become aggravated, but within a few days there was some improvement in all directions. On April 4th, the calcium content of the blood had increased to 6.9 mg. per 100 c.c., and the electrical irritability had commenced to lessen. For one week following this period there was very little change in the signs, so the dosage was increased to 20 minims, three times a day. This increase was followed by a rapid disappearance of all signs of tetany. Observations were discontinued on April 18th, at which time the blood calcium was 8.3 mg. per 100 c.c.

Case 7.

W.H.—Age 8 months.—Admitted April 12th.

The child was brought to the hospital on account of having had three convulsions during the previous 24 hours and also a "crowing noise" off and on during the previous two months, while crying. He had always been constipated and vomited occasionally. This patient had only been breast-fed up to the age of four months, and from that time until admission had been fed milk, water and sugar mixtures.

On examination there was found some parietal bossing and slight rachitic beading of the ribs. The mechanical signs of tetany were all quite marked. The electrical irritability was also quite definite and the child had several convulsions during examination for which magnesium sulphate, 8 per cent. subcutaneously was employed.

The calcium content of the blood was 6.1 mg. per 100 c.c. On April 12th plain cod-liver oil 15 minims, three times daily, was begun and was increased to 20 minims, three times a day, on April 16th.

There were no convulsions following the first day in hospital.

The mechanical signs became less marked about April 24th, the electrical irritability became less, and the calcium content of the blood began to increase about the same time. The mechanical and electrical signs had completely disappeared by May 4th, and on May 9th, the calcium content of the blood had become normal. At this point observations were discontinued, but the plain cod-liver oil, 20 minims, three times daily, was continued.

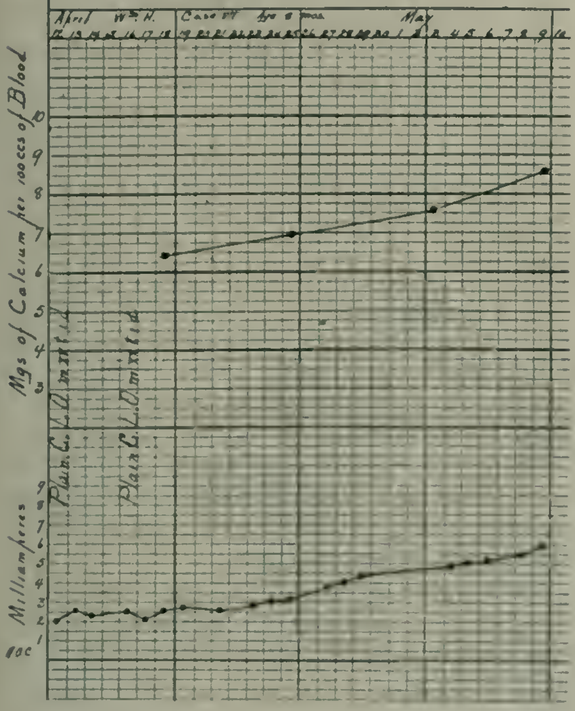

Fig. 7 (Case 7) Findings as in Case 6.

Discussion

From a perusal of these protocols and charts, it will be seen that the results are identical with the observations in our previous paper. Thus phosphorus is unnecessary in the cod-liver oil. This statement may be strengthened by the fact that we have obtained similar cures in many other cases in which the blood calcium was not estimated.

From a careful consideration of the cases reported in this and the previous paper, combined with the observations of Holt and colleagues, and Schloss, we have arrived at certain conclusions:—first, that an adequate amount of fat must be taken and second, that there must be sufficient "fat-soluble A" along with the fat.

To substantiate these statements we have calculated the fat requirements on Holt and colleagues' basis, and compared them with the fat intake in each case under treatment. We found that in the sixteen cases (both papers) in only two instances was the fat intake not quite up to the fat requirements, and in these two cases, the cure was a little more prolonged than the average. In each instance, the fat intake included a certain amount of cod-liver oil in addition to the ordinary milk-fat.

Our findings are quite in agreement with those of Hess and Unger (9) who consider that the "fat-soluble A" vitamine in cod-liver oil probably differs both quantitatively and qualitatively from the same element in cow's milk fat. It is quite probable that the "fat-soluble A" as it occurs in cow's milk fat is not sufficient to prevent rickets, for certainly it has been proven clinically many times that large quantities of milk alone do not protect against rickets and that a small amount does not lead to its development. Some further light on this point in question has been thrown by Dutcher and co-workers (10) who found that the vitamine content of cow's milk is dependent upon the vitamine content of the ration ingested by the cow; that is to say,, that milk tends to deteriorate when the diet of the cow is low in vitamines, while the milk becomes of higher nutritive value, also immediately upon the ingestion of a vitamine-rich ration.

It thus appears that while milk fat contains a considerable proportion of the antirachitic vitamine it cannot always be relied upon to cure; it may, however, be augmented by the addition of cod-liver oil, the combination of these two alone is sufficient not only to protect against rickets, but actually to effect a cure.

Conclusions

1. Cod-liver oil without phosphorus produces regularly an increase in the blood calcium with a corresponding reduction in the mechanical and electrical signs of tetany in approximately the same time as is effected with cod-liver oil and phosphorus.

2. Provided there is a fat intake of 4 mg. per kilo which ensures the best calcium absorption, the addition of the growth factor "fat-soluble A" as contained in plain cod-liver oil is enough either to prevent or to cure rickets.

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ACIDOSIS*

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IN this short paper of Acidosis, I have endeavoured as far as possible, to eliminate all chemical problems, and to use and explain only clinical facts.

In order, however, to understand why certain facts lead us to a diagnosis, and why we base our treatment on these facts, it is necessary for us to have a superficial knowledge of what occurs in the body during acidosis. The blood as we know is alkaline, kept constantly so chiefly by its bicarbonate content, and it is so slightly alkaline, that during health there is little or no change in its reaction, despite changes in the acid or alkali intake, or in their production in the body. If then this bicarbonate content of the blood is disturbed by the introduction of acid, we get symptoms and general changes in the whole organism which we call acidosis. It seems necessary then, to have a change in the bicarbonate of the blood plasma before acidosis can be said to exist.

Naunyn who first gave a name to this acid condition, recognized only one type, that associated with the production of acetone bodies. Since then many other forms have been noted, and it might be well to designate a few of them as the conditions in which they occur are so numerous.

The best known type is that associated with diabetes and the development of acetone bodies and indeed it is from this particular type that the largest amount of our information about this condition has been accumulated.

Nephritis on the other hand is a disease in which a tremendous acidosis may develop, associated in no way with acetone bodies but due rather to the retention or improper secretion of the normal acids of metabolism, plus perhaps some derangement of the liver function with which we are unacquainted. Diarrhoeas severe enough to drain away the alkalis, or vomiting severe enough to prevent their intake, together with numerous other causes are all contributory to this condition. Anaesthetics seem to me to deserve special mention, because of the frequent appearance of diacetic acid in the urine after their administration.

It looks to me as if too much fuss has been made about this usually mild condition, and if we consider the fact that it rarely produces any grave results it would be better to ignore its presence. Its degree is, after all, the main point to establish, and if one of the several very excellent methods at our disposal were used for estimating its intensity, a good deal of the fear its presence excites would be dissipated, and the patient who has probably already suffered at the hands of the surgeon, would not have to undergo the added discomforts of the treatments now used.

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*Read at Annual Meeting of the Manitoba Medical Association.

During the course of normal metabolism acids in considerable amounts are being constantly produced, but, so efficient is the mechanism for the elimination of these acids, under usual conditions, that they do not disturb, or in any way change the daily course of events. When, however, for any reason an increased accumulation of acids has taken place with an insufficient mechanism for their elimination, then the balance of the whole alkali reserve of the body is disorganized, the bicarbonate of the blood plasma as we have already mentioned is altered and we get a condition of acidosis.

The main sources of elimination of acids are through the kidneys and lungs, the blood carrying them to the organs as they occur. It is therefore from these sources that the bulk of our information is to be obtained both as to whether an acidosis exists, and as an estimation of its degree of intensity.

By way of the lungs, because of their easy accessibility, we are able to gain a vast amount of information. The very efficient and simple apparatus devised by Marriott for the estimation of the CO2 tension of the alveolar air, will not only confirm the diagnosis, but will estimate at the same time the amount or degree of acidosis existing. This tension in a normal person measures about 40 or 50 M.M. of Hg., but in one with acidosis it falls and in the very severe types associated with diabetes or nephritis, may go as low as ten or even lower.

This fall in the CO2 tension is brought about in this way. We have seen that the bicarbonate content of the blood during acidosis is changed towards the acid side, but that normally this is kept at a constant level. When therefore this change toward the acid side takes place, due to the flooding of the blood by the strong non volatile acids such as di-acetic or oxybutyric, this buffer salt of bicarbonate is depleted and CO2 is set free.

This excess CO2 must be eliminated or reduced to prevent a very serious change in the reaction of the blood. The respiratory centre, which is most sensitive to the slightest disturbance of the normal blood reaction, is now stimulated on account of this change, and responds accordingly with an increase in pulmonary ventilation giving us the symptoms of hyperpnoea or air hunger.

The purpose of this deep breathing—the rate of which may or may not increase—is to lower the concentration of the CO2 in the alveolar cells, so facilitating its escape from the tissues, the result being that the greater the acidosis the lower will be the CO2 tension, and the greater the acidosis the more pronounced will be the air hunger. It will be seen then that while this lowered CO2 tension is designed to prevent any dangerous change in the blood reaction it does not prevent a diminution of its bicarbonate content.

While the estimation by the lung has much advantage over the kidney because of its accuracy and simplicity, still the urine on the whole is reliable and gives us much valuable evidence, and if we recognize our types will not be a source of error, but is very likely to fail us when we estimate degree. Taken in conjunction, however, with the CO2 tension, one will help to check the accuracy of the other. The presence of di-acetic acid in the urine will serve to inform us that acidosis is present, and will give us by the intensity of its reaction a rough idea of its degree. This for routine is the most useful and easiest method, and if associated with diabetes is always important.

The estimation of the ammonia output is another very valuable and more accurate test than that for di-acetic acid, because of its variation from normal in acidosis. During normal metabolism this is in large part carried to the liver and there converted into urea. When, however, acidosis exists, much of this ammonia is used as one of the defences against that condition. It unites with the acids to neutralize them, and is put out in that combined form. The normal output is about 1 to 1½ gms. daily, but as this varies somewhat, it is usually estimated that 2 gms. or over means acidosis, and of course the greater the acidosis the greater the amount excreted. This estimation can be shortened by six hour specimens, or by estimating it on a percentage basis if one is hurried and cannot wait for the 24 hr. specimen. There are traps here, however, in which one may get caught if he is not wary. We have seen that the very gravest type of acidosis may exist with nephritis. If then, we rely on either the detection of diacetic acid, or the estimation of ammonia to make our diagnosis, we may fail, for di-acetic acid may be absent, and the ammonia may be normal or less than in health. This illustrates the advantage of the lung over the kidney for the detection or accurate estimation of the degree of acidosis.

1. Sellards test is another method, easily done and very useful. It is based on the amount of bicarbonate of soda necessary to render the urine alkaline. In children usually 2 or 3 gms. will be sufficient, while in older children and adults 5 gms. overcome the acidity. When acidosis is present, however, much larger amounts are necessary to obtain this end. One must remember, if we are to accept recent opinions on acidosis, that alkalis are contra-indicated in diabetes and therefore this test cannot be used in acidosis of that type.

2. Of greatest importance is the chemical examination of blood in which an estimation of the CO2 or measurement of the alkali reserves is admittedly the most accurate of all. For the present this has not been open to us for various reasons.

The treatment of acidosis presents so many problems that it is out of the question to deal with all in this short paper, and as the acidosis occurring in diabetes is our chief type we will use that as a basis for this discussion.

Theoretically the administration of alkalis would seem to be the obvious method of combating this condition, for as has been shown the alkali reserve of the body has been, or rather is being, used up and it is our business to replace it, but clinical experience has proven that this method of procedure is not very successful, and while it may be useful in some cases, it is after all merely symptomatic treatment without consideration of the cause. Besides the use of alkali is not free from danger, and the large doses often necessary may cause such irritation of gastro intestinal tract that they will induce vomiting, a condition we are particularly anxious to avoid. Then again when alkalis are taken over long periods, they tend to deplete the body of necessary salts, particularly chlorides, and when given intra-venously during severe diabetic acidosis tremendous amounts of acetone bodies seem to be liberated from the body cells, doubling, or trebling their concentration in the blood. Whether this produces toxins which kill the patient is not known, but not seldom they promptly die.

Since recent work has shown that fat is the chief source of acetone bodies, it seems more profitable to attack the problem from that angle, and it has proven to be the best method for combating, and preventing that condition. Joslin, who was the first to champion this treatment has had remarkable results, and a great decrease in the number of deaths from this cause. In diabetes the assimilation of carbo hydrate is interfered with, and because of this the combustion of fats is not complete. They smoke as it were, and the smoke represents the acid bodies. This same form of reasoning may apply to any form of acetone body formation, as for example starvation acidosis, but it does not necessarily imply that the treatment must be the same.

The elimination of fat from the diet is then our first concern when we are called upon to treat an acidosis of the diabetic type. If you will permit me I would like to point out here that one cannot give too minute instructions as to what is or is not fat. Many people regard fat as only that associated with meat, and will eat butter and eggs, drink broth or milk in blissful ignorance, quite certain they are following instructions.

Fluids are perhaps the next most important adjunct in treatment after the elimination of fat from the diet. The retention of these by the body is a great necessity in order that the acids formed may be got rid of and diluted. This will be readily understood when we consider the fact that acid bodies are never found in the urine in a higher concentration than 1.5 per cent., and this concentration only in coma, .6 being about the highest outside of coma. It is evident therefore that the elimination of acids is directly dependent on the amount of water excreted.

Joslin has for this reason laid down the general rule in his words, that any patient with acidosis should get 1000 c.c. of fluid every six hours. That in order to avoid over burdening the stomach and causing vomiting with its consequent loss of body fluid they should be given in small quantities at a time. The contra-indications for this treatment are oedema from any constitutional cause such as in nephritis or failing heart.

Salt is another important consideration in treating acidosis. It is obvious if there is salt retention and oedema, that it, as well as fluids, should be restricted, but its sudden withdrawal in diabetes may precipitate an acidosis that could otherwise have been avoided. This sudden withdrawal increases the urinary output and depletes the body of its necessary liquid, it is therefore advisable that broths, fat free, but rich in chlorides should be included in the fluid intake. Salt on the other hand may act as a diuretic, so one has to be careful not to allow the patient to choose his own amounts. That which is contained in broth is usually sufficient.

Alcohol is often freely used in acidosis for it has been agreed that a patient can take more fat if he is also taking some alcohol. Its chief action appears to be its virtue in preventing the combustion of fat, thus lessening the production of acid bodies. When used it should be given in very diluted form and if diabetes without sugar.

To those needing orientation—and who does not need it? in the domain of the study of the Internal secretions—a review of the subject as it relates to the Pituitary Gland, by Prof. Harvey Cushing in a recent number of the J.A.M.A. comes as a most refreshing albeit extremely cautious summary.

He lays stress on what needs to be still further emphasized, the slow progress of actual knowledge in the realm of Endocrinology, and the very rapid growth of speculation, and the cheerful adoption by many of airy fancies as solid facts. There is no doubt that upon a foundation of such fancies with a fact here and there stuck in, may be built up a very brilliant therapeutic system, in which a dash of this gland for that symptom, and of that gland for the other symptom may finally come to differ from the polypharmacy of another generation only in the substitution of animal's 'insides' for vegetable tinctures.

That the laboratory worker and clinical observer are pushing forward the confines of knowledge surely, if slowly, Dr. Cushing would not have us forget, and in the meantime while we "let knowledge grow from more to more" there remains as regards the matter of therapeutic the attitude of Rational Empiricism so aptly set forth by Prof. Rudolf at the recent meeting of the Canadian Medical Association, of which the motto might well be "Prove all things. Hold fast that which is good".

THE REPAIR OF BONY DEFECTS OF THE CRANIUM*

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THE late war brought the subject of the repair of defects of the vault of the skull to the attention of all military surgeons who were called upon to treat the wounded invalided home suffering from the effects of the loss of large portions of bone from the cranium.

Nearly all these wounds of the skull were septic and in a large percentage of cases loose or necrotic bone had to be removed at hospitals near the front or later at hospitals far removed from the battle zone.

In civilian practice it is not rare to meet with identical defects of the skull produced at operation as falls from a height or by result of flying missiles or machinery accidents such as the bursting of emery wheels.

It is not my intention to refer to small deficiencies in the skull without involvement of the meninges or brain and causing no symptoms, nor to large defects purposely made for decompression, where it is intended that the opening shall remain.

When the hiatus is present in the frontal, parietal or occipital bone above the superior curved line, it is usual to have symptoms of unstable intracranial equilibrium. Where strong and thick muscles cover the vault as in the temporal or subtentorial regions, the brain is amply protected and supported, so openings here seldom require any operative interference.

It may be very difficult to differentiate symptoms caused solely by the presence of a gap in the bone with hard unyielding margins from those due to the effects of injury to the underlying brain or to the presence of some foreign body.

Where a large opening exists, there is visible pulsation or an impulse on coughing or during strong expiration. Where the hole is very large a protrusion may even be seen on sudden effort.

The symptoms from which the patient suffers, vary considerably in individual cases. The usual manifestations are: Headache, blurring of vision; dizziness, especially when in a stooping position; and perhaps intolerance to bright lights or loud noises. Insomnia may be troublesome.

These patients may complain of pain and vertigo when the scalp over the hiatus is even gently pressed upon. The fear of impending death from pressure or blows on the unprotected area often gives the patient great anxiety. Any of these above-mentioned symptoms may be present in a single case alone or in combination.

The writer has been struck with the fact that openings near the base of the skull are usually associated with much more suffering than those situated at a higher level, but this does not apply in every case.

A disfiguring, depressed, pulsating area in the frontal region is surely worthy of repair, with the slight risk of operation, from a cosmetic standpoint alone.

The wearing of some form of pad or plate over the scalp is of very doubtful value, for although it may give to the wearer a sense of protection from trauma from without, it plainly serves no useful purpose in protecting the brain from the constant jarring against the sharp or uneven margins of the aperture.

Cases are on record where Jacksonian epilepsy has been cured by cranioplasty alone, but it must be understood that this operative procedure cannot possibly change or remedy gross lesions of the underlying brain, the more probable cause of this malady.

There are several contraindications to the operation of cranioplasty with its various modifications, *i.e.*, (a) The existence of grave constitutional or other disease, such as would contraindicate any operation of expediency; (b) The presence of a cough is, for the time at least, a contraindication, for there is danger that the graft may be displaced and, furthermore, when transplants are taken from the lower thoracic region, coughing causes much distress following operation. Consequently cough or bronchitis, if present, must first be cured before attempting repair.

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The size of the defect is no barrier to operation for the larger the aperture the greater is the necessity for plastic surgery. The presence of sepsis is fatal to success, but when the original wound is soundly closed and the scar free from adherent scales, operation may safely be performed. No attempt should be made to close the breach if there is a hernia cerebri present or increased intracranial tension.

Many operations have been devised for the closure of cranial defects, such as the use of decalcified bone plates, sliding osteo-periosteal flaps from the neighbouring external table of the skull, autoplastic or homoplastic bone grafts have been used with success. Plates of gold or silver, plain and perforated, or ivory plates, are all open to the objection that they are not absorbable and may act as irritants, although one author reports six cases where perforated silver plates were employed with success in every case. And lastly, the use of autogenous cartilage grafts should be mentioned. This method was first described by Morestin in 1916 and the operative technique was later improved by Villandre of Lyon.

The advantages of this method of procedure are many. The writer has followed this plan in six out of seven cases and has been so well satisfied with the results that any remarks that may follow will be devoted particularly to this procedure.

To enumerate briefly some of the advantages which are claimed in favour of autogenous cartilage grafts over other methods for the closure of openings in the skull: 1. The risk is practically nil and the shock is slight or absent and the suffering following operation is not great. 2. The grafts are autogenous, easily procured and in any reasonable amount. 3. The recovery is speedy and uneventful and the results eminently satisfactory. 4. There is no need to wait longer than the time necessary to procure a clean external wound before operating; this saves much time as compared with the tedious delay, usually six months, which is absolutely essential to ensure success when bone grafts are employed. 5. Cartilage seems to possess a power of resistance to infection unknown to bone grafts. 6. The operation is simple and requires no special instruments whatever. 7. Oncurved surfaces, such as in the frontal bone, better cosmetic results are obtained from the ease with which the graft may be moulded to the contour of the surrounding bone.

Technique of operation. The patient's scalp, chest and upper abdomen are shaved and the operation-areas are painted with iodine solution and suitably covered with sterile towels of a screen. The attachment to patient's forehead, between anæsthetist and operator is advised, but is not essential. The anæsthetic may be either chloroform or ether. Local anæsthesia, for many reasons, is not to be recommended. The intratracheal or intrapharangeal method of induction is excellent. Rectal administration would seem ideal, but it has been found to be uncertain in its effects and even dangerous at times.

The skin incision must be carefully planned in order to avoid unnecessary scarring in exposed regions, such as on the forehead where the original scar, if present, had better be followed. All scar tissue should be excised, if possible, as stitches will have a very insecure hold if placed in cicatricial tissue. It is sometimes possible to make an incision along the hair-line or following the eyebrows and then to uncover the defect by turning the soft tissues down or up as the case may be. The classical horse-shoe shaped flap has not found favour as it encourages the formation of a hæmatoma beneath. Personally we have used this curved incision on several occasions, using silk-worm gut as a drain in one end of the wound for forty-eight hours, and have had no reason to regret it. A crucial incision with its centre over the gap, with excision of all scar, is probably the best The flaps are carefully raised in the plane of the subaponeurotic layer and if strictly adhered to, it is usually easy to approximate the skin edges afterwards without undue tension, by suitable undercutting.

After the gap has been freely exposed well beyond its margins, all scar tissue must be removed. This must be done with great care and deliberation, otherwise the dura may be unexpectedly opened, the dura indeed may be non-existent, being replaced by a delicate layer of fibrous tissue. The plane of dissection must be parallel to the surface and any rent incidentally made to allow cerebro-spinal fluid to escape, must be carefully sutured with fine cat-gut.

One of the most important steps of the operation now follows: The pericranium is carefully incised all around close to the margin of the opening in the bone, the greatest care being made to avoid any chance slip of the point of the knife, which might be disastrous. This very narrow strip of pericranium is now carefully elevated and the operator gradually works the instrument around the edge of the hole, aided by slight nicks with the point of a knife, until the elevator can be freely passed under the skull completely around between the dura and the bone. This step is absolutely essential on account of the danger of leaving behind projecting spicules of bone irritating to the brain.

No attempt to remove the island of granulation tissue in the centre should be made or troublesome oozing is likely to occur. This boss of tissue will do no harm, but on the contrary, will help to support the graft. No apprehension need be felt that the leaving of this central material will give rise to pressure, in fact, those cases showing a slight protuberance after operation give finally the best results, as some recession of the graft is sure to take place later.

All bony spicules and irregularities of the margin of the opening must next be removed by a rongeur or suitable instrument. The writer is in the habit of making the aperture as regular in contour as possible, facilitating the accurate fitting of the graft.

One-half or more of the outer thickness of the bone is next cut away so that a gutter is left all around the margin of the opening. This may be done with an electric burr, but we find a gouge and mallet more easily manipulated and a groove may be as quickly cut as with the electrically-driven instrument and without the objection of overheating, the leaving behind of bone dust or the danger of the instrument's slipping.

The length and breadth of the hiatus are next ascertained and two probes are bent to mark these measurements. The whole area is now covered with hot moist compresses while the cartilage grafts are being cut.

These transplants are cut from one-half the thickness of the sixth, seventh and eighth costal cartilages, preferably from the same side as the head wound. The best incision is a vertical one, two finger-breadths outside the sternal border and splitting the fibres of the rectus abdominis muscle. The cartilages of the ninth and tenth ribs are too thin and narrow to be of much use.

Special knives were devised by Villandre having shanks set at an angle, bayonet-wise, to facilitate cutting parallel to the surface at the bottom of a fairly deep wound. Personally we have found a knife of this pattern very difficult to manipulate with firmness and precision and, therefore, prefer a very short-bladed scalpel with a keen edge. In removing catilage first plot and mark out a block sufficiently large, if possible, to cover the whole bony defect in one piece, using the bent probes before mentioned as a gauge,then with the scalpel make a cut perpendicular to the surface for one-half the thickness of the cartilage. The blade of the knife is next sunk in for its full depth at the lower edge of the area outlined and at a depth equal to one-half the thickness of the cartilage and a transverse cut is made which raises a slip from the lower part. This strip may now be lightly seized with a dressing forceps and rolled slightly upwards, exposing the situation of the next slicing cut. This is continued until the removal of the graft is completed, when it is transferred to a saline solution.

When about to do a cranioplasty we have at times attempted to procure a suitably-shaped portion of the vault of the cranium of a new-born dead baby but were never successful in finding any such material when most wanted. Cranial pieces of this sort could easily be used as a graft, for it could be procured of any size and shape and in any amount, and two superimposed layers might be utilized if necessary. The cartilage graft always curls somewhat, bringing the perichondrium into the concavity.

While the operator is placing the graft in the skull, much time will be saved if an assistant closes the thoracic wound in layers.

The graft is now accurately trimmed into shape with scissors and with the perichondrium-covered-side down, is fitted into the defect of the skull with its edges lying in the bony groove around the margin of the hole.

The graft is next sewn all around to the cut edge of the surrounding pericranium, with interrupted cat-gut sutures or, as has seemed better to the writer, has been attached by four widely separated sutures and by the using of a zig-zag suture back and forth across the face of the graft, catching the edge of the cut pericranium on each side in the stitch. The graft is thus effectually and firmly fixed in position in much less time than is usually consumed

The scalp is accurately sutured and a drain of several strands of silk-worm gut placed in one angle of the wound for forty-eight hours.

The after treatment consists largely of morphia to control the pain always present, in the thoracic wound. It is advisable to prop the patient up in a semi-recumbent posture. The stitches may be removed in ten days and the patient allowed to be up out of bed.

SUMMARY

The results of cranioplasty in relieving the patient of some or all of the distressing symptoms mentioned in the early part of this paper are excellent. In most instances the patients are cured, or if not, are greatly benefitted. It is not to be expected that this operation will materially improve those cases where brain lesions are present following injury, but it is intended to protect the brain from repeated traumatism on the margins of the bony outlet. In our experience it requires at least three months before the results of cranio-plasty can be fairly judged.

The writer has operated upon seven cases, four of which have been entirely cured, two much benefitted, and one unimproved. This last case showing no improvement, was one in which the damage was caused by a bullet, there was good reason to believe that the brain was seriously damaged. This might account for the failure to obtain a good result. In all cases the skull is now firm and symmetrical and in two, with frontal bone involvement the cosmetic result is excellent.

It is probable that the cartilage graft never ossifies, but remains firmly attached to the surrounding bone by fibrous tissue.

Retrospect

THE TOXIC ACTION OF ARSPHENAMINE AND NEOARSPHENAMINE

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RECENTLY arsphenamine and its congeners have been the subject of considerable interesting investigation along pharmacological and chemical lines, and particularly on the subject of the toxic reactions which frequently follow their administration. While at times the involved polysyllabic chemical formulæ are apt to be disconcerting to the average reader, these investigations have a decided practical bearing in that they tend to bring about reform and standardization of the methods of administration of compounds, which in the past have often been given with a neglect of essential precautions that is almost criminal. It may, therefore be of interest if a brief review is made of certain papers which have recently appeared.

The great war was responsible for a large number of substitutes for the original German preparations of 606 and 914, which bore the trade names of salvarsan and neosalvarsan. It is highly important that these drugs which are almost universally given by the intravenous route, which, if the most effective, is not the least hazardous, should be as free from dangerous chemical impurities as possible. Both the British and United States Governments have bureaus which demand certain standards of purity. Their tests are based upon toxicity tests among the lower laboratory animals. At the Hygienic Laboratory of the United States Government in Washington, use is made of white rats. For arsphenamine, it is required that white rats weighing from 100-150 grams shall tolerate 100 mg. of the drug per kg. of body weight for forty-eight hours. The drug is given intravenously in a 2 per cent. alkaline solution in water, 0·9 c.c. of normal sodium hydroxide solution being used for 100 mg. of arsphenamine. For neoarsphenamine, the white rats are required to tolerate 200 mg. per kg. for seven days, the drug being given intravenously in a 4 per cent. aqueous solution. It is further required that for both compounds the rate of injection shall be 12-15 seconds for every 0·1 c.c. of solution.

The British Government requires the tests to be made by the Medical Research Council of the Board of Trade. Here the animals used are albino mice, and 125 mg. per kg. are required to be tolerated.

Schamberg[1] points out that toxicity tests of 606 and 914 among the lower animals possess definite chemical value, as a means of establishing standards of purity for these compounds. Animal tests show lethal toxicity only, that is, the duration of life after administrations of given amounts per kgm. of body weight. Calculated upon the highest tolerated dose by intravenous injection in healthy rats, and granted the tissues of the human body are of the same susceptibility, the highest tolerated dose of arsphenamine for the average adult weighing 70 kgm. would be 7·55 gm. and for neoarsphenamine 17.5 gm. Probably, however, as rabbits are less susceptible, human beings cannot tolerate these compounds in proportionate doses. As, however, the highest single dose of arsphenamine and neoarsphenamine seldom exceeds 0·6 gm. and 0·9 gm. respectively, the margin of safety is considerable. Neoarsphenamine is about 2·4 times less toxic than arsphenamine.

Roth[2] in animal toxicity experiments, carried out in the Hygienic Laboratory at Washington, showed that there is a marked difference in the behavior of arsphenamine and neoarsphenamine in the animal organism, and the non-identity of the two compounds must be kept clearly in mind. Several of his conclusions are most important to the physician who uses arsphenamine and neoarsphenamine.

1. Intravenous injections of an acid solution of arsphenamine are much more toxic than the corresponding alkaline solution, the toxicity increasing with the concentration.

2. A properly alkalinized 2 per cent. solution of arsphenamine, when given intravenously is slightly more toxic than a $\frac{1}{2}$ per cent. solution.

3. The toxicity of a properly alkalinized solution of arsphenamine increases greatly as the rate of its intravenous administration is increased.

4. Shaking aqueous solutions of neoarsphenamine or alkalinized arsphenamine in the presence of air markedly increased their toxicity[3].

5. When neoarsphenamine dissolves with comparative difficulty it is usually highly toxic and should be discarded.

There is a Chauvinistic touch about his research into the comparative toxicity of United States and foreign (Canadian, French, Japanese and German) products, as a result of which he declares that arsphenamine preparations of United States manufacture are generally less toxic than those of foreign manufacture.

Kolmer and Yagle[4] have investigated the hæmolytic activity of solutions of arsphenamine and neoarsphenamine. They found that solutions of arsphenamine in isotonic saline are from three to ten times less hæmolytic than solutions in water, and that concentrated solutions of arsphenamine in water and isotonic saline are more hæmolytic than dilute solutions. The addition of sodium hydroxide to solutions of arsphenamine in water and isotonic saline solutions for purposes of neutralization unavoidably increases their hæmolytic activity, which is further increased by the addition of an excess of the alkalil

The addition of sufficient alkali to the point of clearing causes the formation of the monosodium salt of arsphenamine, which was Ehrlich's original recommendation for administering the drug. The addition of further alkali produces or partially produces the disodium salt, which is generally regarded as less toxic. Whether solutions of disodium salt are less toxic than solutions of the monosodium salt is yet to be conclusively proven. From the standpoint of hæmolysis alone, the addition of just enough alkali to clear is preferable to solutions where one-third excess of alkali is added. Kolmer and Yagle recommend the addition of one-fifth excess of alkali. From the point of view of toxic reaction, the benefit of this procedure has been confirmed in the clinic at the Montreal General Hospital, in a large series of administrations. The reactions were far fewer where this amount of excess of alkali was added, than where only sufficient alkali was added to clear.

These authors point out that owing to the production of sodium chloride when arsphenamine is dissolved in water and neutralized with sodium hydroxide, "in the preparation of isotonic solutions, varying strengths of sodium chloride in distilled water must be used according to the total volume of fluid desired," and that "a salt solution of one uniform strength does not suffice for all concentrations". For the ideal concentration, *i.e.*, a .5 per cent. solution of arsphenamine, a sodium chloride solution of the strength 0·77 per cent. is required to render the resulting solution isotonic.

With neoarsphenamine the case is somewhat different. Dilute solutions of neoarsphenamine, as 0·9 grm. in 90 c.c. of more of water, are hæmolytic, as the solution is hypotonic. Concentrated solutions, as 0·9 gm. in 30 c.c. of less of water, are not hæmolytic, owing to the presence of sufficient inorganic salts from the drug to render the solution approximately isotonic. If dilute solutions of neoarsphenamine are to be given, then sterile physiological saline in freshly distilled water should be used. If concentrated solutions are given, then sterile distilled water is to employed.

The administration of intravenous injections slowly rather than quickly, allows an opportunity for the dilution of the hæmolytic solution of arsphenamine with the blood, and therefore reduces its hæmolytic activity.

There would appear to be a sufficient parallelism between the toxicity experiments of other authors and the hæmolytic experiments of Kolmer and Yagle to warrant the procedures outlined being followed in the technique of administering arsphenamine and neoarsphenamine intravenously.

The untoward effects that frequently follow the injection of these arsenical compounds have been the subject of much interesting discussion. There are three clinical types of reaction: (1) immediate, (2) early and (3) delayed. The immediate reactions are the so-called nitritoid crises; the early reactions are febrile and gastro-intestinal; and the delayed reactions are referable to the brain, liver or gastro-intestinal tract.

Hunt[5] states that the following types of reactions have been observed:

1. The toxicity is due to the "arsenoxid";
2. The toxicity is due to the presence of toxic substances other than the arsenoxid;
3. The toxicity is due to the physical properties of the solution.

Ehrlich was of the opinion that the arsenoxide was responsible. In this respect, Roth[3] showed that the toxicity of alkaline solutions of 606 was increased by 60 per cent. after one minute's vigorous shaking in the presence of air. Hunt supports the contention of Roth by showing that such solutions may be rendered non-toxic by means that cause further oxidation, by adding sodium hyposulphite and by continued aeration with warming. He states that no toxic or experimental commercial preparation of arsphenamine was met with, the toxicity of which could be attributed to the oxide.

Schamberg[8] is of the opinion that the immediate vasoparetic symptoms are due to the presence of an unidentified impurity in 606, which he has named substance X.

This view is not universally accepted, however. For instance, the British Salvarsan Committee states that "there is no evidence to justify the conclusion that ordinary variations of toxicity, apart from those due to exposure of the substance to air, are due to the presence of impurities more toxic than arsphenamine itself.

Danysz[8] attributes many of the reactions of arsphenamine to the intravascular precipitation of the latter by certain inorganic constituents of the blood. This may be true of acid solutions of arsphenamine, and probably also concentrated solutions of monosodium arsphenamine, but there is no adequate evidence that precipitation occurs after the use of disodium arsphenamine, and none at all that neoarsphenamine is ever precipitated in the blood. The injection of acid solutions of arsphenamine is prone to produce death, and if less concentrated, may lead to the development of a broncho-pneumonia, as a result of intravascular precipitation of the drug. Concentrated solutions of the monosodium salt may act similarly. This chain of events has not been noted after the injection of disodium arsphenamine solution, or of neoarsphenamine, but cloudy neoarsphenamine solutions are likely to produce severe nitritoid symptoms. As neoarsphenamine does not cause intravascular precipitation, there is introduced here an element of confusion and the cause remains to be elucidated.

Schamberg and his co-workers believe that if arsphenamine is properly neutralized, and the disodium salt and not the monosodium variety is injected, intravascular precipitation does not take place. Certainly it does not occur in vitro.

Smith[6] has studied the rise in the pulmonary arterial tension after arsphenamine injections. This he finds is due to two factors, first the mechanical blocking of pulmonary arterioles due to intravascular precipitation; second, the vasoconstrictor action of arsphenamine on the pulmonary vessels. Acid solutions of arsphenamine and monosodium arsphenamine will produce mechanical blocking. The minimal effect was produced by the injection of an alkaline solution representing a mixture of the mono and disodium salts, one in which 0·8 c.c. normal sodium hydrate per 100 mgm. of the drug was added. This solution in 0.5 per cent. dilution, and given rather slowly, produced no appreciable effect on the pulmonary pressure. The danger of adding an excess of alkali lies in the augmentation of the vasoconstrictor action of the drug. Smith concludes that the cardiac dilatation following intravenous injection of arsphenamine is not a direct effect of the action of the drug, but is secondary to the pulmonary obstruction.

It is probably true that there is no one cause of reaction. The ætiologic factors are to be found somewhere in the relation between (1) the patient, (2) the drug, and (3) the technique of administration.

What practical conclusions are to be drawn from all this? Granted that the preparation conforms to Government standards by toxicity tests, the method of preparing the drug for, and the actual technique of intravenous injection are all important. One may therefore lay down the following axioms for arsphenamine and neoarsphenamine, laying stress upon the fact that the solution of the drug for administration involves accurate and important chemical reactions, and that all reagents and apparatus should be chemically pure, and all quantities used scrupulously exact.

1. Glassware and other apparatus used in mixing and injecting should be dry sterilized.

2. Distilled water should be freshly distilled, and the saline solution should be prepared from freshly distilled water.

3. For arsphenamine injections, isotonic saline should be used, the drug being in a concentration of 0·5 per cent. (0·1 gm. dissolved in 20 c.c.). This requires 0·7 per cent. saline solution to render it isotonic. Chemically pure normal sodium hydrate (4 per cent.) should be added slowly from a special burette till the solution clears, and then one-fifth in excess added, and the resulting solution filtered.

4. Solution should not be aided by too vigorous shaking. The mixture should be administered as soon as possible after preparation, and should be injected rather slowly and through a needle whose calibre is not too large.

5. For neoarsphenamine injection, if concentrated solutions are used (0·1 gm. in 3 c.c.), distilled water should be used. On the other hand, if dilute solutions are used, normal saline solution should be the medium.

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Case Report

FROM THE SURGICAL CLINIC OF DR. F. N. G. STARR

Toronto General Hospital

Case No. 1. *Cholelithiasis—Acute hæmorrhagic pancreatitis—Volvulus of the small intestine.* Female, age fifty-five, widow. Admitted to Ward C., Toronto General Hospital, December 26th, at 11.00 p.m.

Complaint: (1) Abdominal pain in the right upper abdomen. (2) Vomiting for four days. (3) Inability to take food for six days.

History of the previous condition. Fifteen years ago she fell down stairs, and was confined to bed for two weeks. Shortly after this fall she began to suffer from what she termed "indigestion", associated with pain in the epigastrium, coming on about twenty minutes after meals. The pain was relieved by drinking warm water. Constipation dated from this time, and ever since frequent cathartics have been necessary. It was not unusual for several days to elapse without a bowel movement. Ten years ago there was a very severe attack of pain confined to the left hypochrondrium. This attack lasted for about twenty-four hours, and was followed by nausea. There have been, subsequently, three or four similar attacks of abdominal pain, coming at long intervals, radiating from the left upper abdomen. The attack immediately preceding the present one occurred in

December, 1920, and started at 3 a.m., waking the patient out of her sleep. This pain was so severe that on attempting to get out of bed she was unable to move, and could only cry for help. There was no pain in the right upper abdomen at this time, the area of maximum pain being in the left hypochondrium. It was constant while it lasted, felt like something grasping the bowel, and left an area of soreness. It did not cease suddenly, but wore off gradually. For the past few months she has had a bloated feeling in the epigastrium, coming on at intervals, with a definite distaste for food, but no actual pain. However, there has been on several occasions a heavy, loaded feeling in the left upper abdomen.

Family History.—Has no bearing on the present attack.

Date and Mode of Onset of the present attack. While scrubbing a floor on December 23rd, 1920, she became suddenly nauseated and vomited her breakfast. Shortly afterwards she vomited several pints of a greenish fluid. This was followed by extreme weakness and profuse cold perspiration. She went to bed, suffering severely from an aching, continuous pain in the left upper abdomen. This severe pain continued without any remission to the time of her admission. It was made markedly worse by moving about in bed. There was a persistence of the nausea and vomiting from the onset until admission, and for the previous forty-eight hours she had been unable to secure a bowel movement.

Condition on Admission. Patient appeared to be very ill, thin, under-nourished, with sallow, white skin; the respiratory system showed nothing abnormal; the cardio-vascular system showed nothing abnormal; her blood pressure was, systolic, 110; diastolic, 82; the nervous system showed nothing abnormal;--urinalysis showed acid urine, specific gravity of 1020, trace of albumen, no sugar; a large number of epithelial cells and a few pus cells were found microscopically.

Abdominal Examination. The abdomen was markedly distended, but moved freely with respiration. The left upper abdomen was more prominent than the right. On palpation, no muscular rigidity was present, the muscles being flaccid. There was marked tenderness in the epigastrium and along the lateral border of the left rectus, where a coil of distended bowel could be palpated. The whole abdomen was tympanitic on percussion, most marked in the left upper quadrant. The white blood count was 22,800.

Diagnosis. Intestinal obstruction. Immediate operation advised.

Operation. September 27th, 12.30 a.m. On abdominal palpation, with the patient under ether anæsthesia, a mass was felt in the left upper abdomen which was taken for an enlarged pancreas. An incision was made through the left upper rectus, and the peritoneal cavity explored. On opening this cavity, a certain amount of blood-coloured fluid escaped, and one was impressed by the numerous areas of fat necrosis scattered throughout the omentum and the mesentery of the small bowel. The whole extent of the small intestine was very red and œdematous. There was a segment, roughly six feet in length, which was more œdematous than the other coils, and in some areas there were large, sub-peritoneal hæmorrhages. On exploring the mesentery of the small bowel, one found that there had been a complete torsion of this structure with volvulus of the small bowel. Near the root of the mesentery was a large area of fat necrosis, measuring roughly one inch and a half by one inch. This was not disturbed, for fear of wounding one of the large mesenteric veins. The pancreas was found to be enormously enlarged and a number of hæmorrhages were scattered throughout its entirety. The gall bladder was enlarged and contained many stones. The common duct, however, contained no stones, and none was found in the ampulla of Vater. The mesentery of the small intestine was untwisted in such a manner as to undo the torsion which had taken place, and the color of the small bowel immediately began to improve. A stab wound was made under the right costal margin, and the gall bladder delivered through this opening. The mid-line incision was then closed. The gall bladder was opened, stones evacuated, and a tube sewn to the opening in the fundus to allow free exit of bile. During the operation forty ounces of saline were given interstitially into the axillary fossæ. On completion of the operation, gastric lavage was done, and a large volume of very foul-smelling gastric contents removed.

Progress Notes. At 5.30 a.m. on the morning of the operation, one c.c. of pituitrin was given hypodermically, followed by a 1-2-3 enema, which resulted in a very satisfactory bowel movement, and the passage of a large amount of flatus. There was considerable shock following the operation, which was combatted by rectal instillation of two drachms of concentrated tincture of digitalis (B. & W.) given in a solution of normal saline containing ten per cent. glucose and five per cent. soda bicarbonate, by means of the Murphy drip method. The gall bladder drained very well, five ounces being collected in the first twenty-four hours after the operation. The subsequent drainage varied from eight to fourteen ounces, until the tube was removed on the 7th of January, 1921. On the 28th of January the pulse began to increase in rate and diminish in volume. An intravenous injection of 600 c.c. of ten per cent. glucose was given, with a markedly beneficial effect. The mid-line incision healed by primary union. The tube was removed from the gall bladder on the 7th of January, and a slight amount of clear normal-coloured bile drained from the fistula. The patient's general condition was excellent; temperature was normal.

January 25th, 1921. The patient was feeling very well, and suffering from no abdominal discomfort. The feeling of heaviness which had persisted for some months previous to operation appeared to have been relieved. The skin was clear, the sallow colour which had been present previous to operation having disappeared. The bile coming from the fistula was daily decreasing in amount, and was of normal appearance.

Comment. (Dr. Roscoe R. Graham.) Acute hæmorrhagic pancreatitis is not very common. A volvulus involving the whole of the small intestine is still more rare, and to have the two conditions appearing simultaneously in the same patient is indeed a most unique experience. In this instance, cholelithiasis was associated with the pancreatic lesion. In a former communication we have pointed out the relationship between gall bladder disease and pancreatic lesions, particularly of the acute hæmorrhagic variety. From the history it would appear that this is not the first attack of pancreatitis from which this patient has suffered. There had been four or five previous attacks of pain, which, according to the patient's story, appeared to be of a very similar character to that from which she suffered at the beginning of the present attack. One must not lose sight therefore, of the fact that acute hæmorrhagic pancreatitis is not necessarily a progressive lesion, and that without operation the patient may recover. It is also interesting to note in this particular instance that there was no local direct operative attack on the pancreas. In fact, the lesser sac of peritoneum was not even opened. The whole condition appeared to have been dependent upon a primary gall bladder pathology, and dealing with this lesion even in the most simple manner, by removal of the stones and drainage of the biliary tract through the gall bladder, was sufficient to bring about a most successful issue. In the past, one has been led to believe that it was necessary to make a very direct attack on the pancreas; in fact, many observers have advised that in all cases one should open widely the hæmorrhagic area of the pancreas, pack in strip gauze, and place a tube in the lesser sac of peritoneum. This instance would seem to prove that the more simple procedure of gall bladder drainage after removal of the stones will accomplish quite as much as the more formidable and time-consuming procedure. One need not, in fact, remove the gall bladder, which consideration, in patients who are so extremely ill, is a decided asset, as even the slightest amount of unnecessary trauma should be avoided. The sequence of events in this particular instance seems to be that the patient suffered from a gall bladder lesion. As a result of her fall fifteen years previously this became acute. We have come to believe, however, that gall bladder disease starts much earlier in life than this would indicate. The patient at the time of her fall was forty years of age, and we believe that the fall of itself would not be sufficient to produce a gross biliary lesion. On enquiring into the past history of a large number of patients suffering from gall bladder disease, we have found that their early life has been associated with so-called bilious attacks, sick headaches, and various types of chronic gastro-intestinal disturbances. In this particular instance, following the disease in the gall bladder, we have the pancreatic affection of chronic fibrotic type, extending over a long period of years, with four or five definitely acute attacks, probably of the hæmorrhagic type, culminating in the present attack of a very severe, acute hæmorrhagic pancreatitis, and following this condition we have superadded a volvulus involving the whole of the small intestine. It is difficult to explain the occurrence of a volvulus of the small intestine with so marked an embarrassment of the circulation in such a definite segment, while the whole of the small intestines were red and œdematous. This cannot be done with any degree of certainty, but the explanation appears to rest in the fact that on the root of the mesentery was found the enormous area of fat necrosis, which would interfere very materially with the blood supply to the segment, which appeared so cyanotic, and which contained so many petechial hæmorrhages. This area of fat necrosis, besides interfering with the blood supply of the loop of bowel, would also interfere with the motor nerve supply, and decrease peristaltic activity, while active peristalsis in the bowel proximal to this area would tend to increase the rotation of the bowel and mesentery.

In view of the operative findings, there are several points in the pre-operative investigation and history which are of interest. This patient was seized with sudden acute upper abdominal pain, and at the time of her admittance there was evidence of free fluid in the peritoneal cavity, associated with a very high leucocyte count. In addition there was a history of previous gastro-intestinal disturbance over a very long period of time. One would immediately think of a perforated gastric ulcer. However, the liver dulness was not markedly diminished, and the point of maximum pain and tenderness, which we believe to be of such extreme importance in the diagnosis of acute abdominal disease, was situated to the left of the middle line under the left costal arch, radiating down the lateral border of the left rectus. This situation of the pain, and an absence of rigidity in the abdominal muscles, appeared to be sufficient evidence to rule out a perforated gastric ulcer. The flaccid abdominal muscles would not be present if the patient were suffering from a peritonitis of an infective origin, but flaccidity is constantly found in acute pancreatitis. The sudden onset of the pain, of such a severe type, persisting without remission in the presence of flaccid recti muscles, and associated with persistent vomiting, should have put one on guard sufficiently to have made a pre-operative diagnosis of pancreatitis. It is true that this was suspected, and a mass was palpated after the patient was under the anæsthetic, and before the peritoneal cavity was opened. However, in this instance, as a result of the volvulus, we have superadded intestinal obstruction, which was evident from the severe abdominal distension and intractable vomiting. This diagnosis was correct as far as it went, but in the analysis of the previous history, type of onset and physical findings, one had in addition a very good clinical picture of a case of acute hæmorrhagic pancreatitis.

CONCLUSIONS

1. Acute hæmorrhagic pancreatitis is always secondary to disease of the biliary tract, and in the large majority of cases is associated with stones in the gall bladder, but not necessarily in the common duct or in the ampulla of Vater.

2. Acute hæmorrhagic pancreatitis is not a progressive disease, and may recover without operative interference.

3. The determination of the point of maximum pain and tenderness in acute abdominal conditions is a most important part of the pre-operative physical examination and will often lead to an accurate diagnosis of the site of the lesion.

4. Rigidity of the abdominal muscles is absent in acute lesions of the pancreas. *Abdominal palpation, with the patient under an anæsthetic, before the abdomen is opened, will often reveal a mass or an indefinite resistance* which could not be palpated before, thus giving a clue to the site of an obscure lesion, and making for more satisfactory results and greater ease in operating. In this instance, with the diagnosis of intestinal obstruction, had one not made a careful abdominal palpation under anæsthesia, the abdomen would undoubtedly have been opened in the lower segment, near the middle line, because, taking into consideration the patient's age, the most likely cause of acute intestinal obstruction would have been a malignant growth in the large bowel, or bands of adhesion which could have been effectively dealt with through an incision in this area.

5. To secure a successful result in an acute hæmorrhagic lesion of the pancreas, the most simple procedure seems to be efficacious. It is not essential in all cases to make a direct attack on the pancreas itself, nor is it absolutely essential to always drain the lesser sac. Opening the gall bladder, removing the stones, and inserting a tube in the gall bladder for drainage, seems to be the one essential procedure.

CASE NO. 2. *Perforated gastric ulcer—closure and posterior gastro enterostomy.* Age forty-two, housewife, admitted to Ward C, Toronto General Hospital, December 18th, 1920. Referred by Dr. J. H. Woods.

Complaint. Sudden severe, epigastric pain.

Family History. Father died of gastric cancer; otherwise negative.

Past Illnesses and Previous Condition. Patient had diseases of childhood, but no other severe infections or illnesses. She has born five children, one living and well; the other four died in infancy. She was perfectly healthy till eighteen years of age, when she began to suffer from what she terms "indigestion". This was characterized by epigastric and retro-sternal pain, coming on two to three hours after meals. This pain radiated through to the back between the shoulder blades. These attacks came on at intervals of from one to two years, and would last for three to four months. Vomiting occurred occasionally, and when it occurred would relieve the pain. The patient volunteered that the vomitus didn't appear acid. Since the onset of this disability she has been continuously constipated.

Three years ago the character of the attacks appeared to have changed. The intervals became much shorter, and the attacks themselves did not last so long. Since this time there has been no definite pain, but more a feeling of distress and fulness in the upper abdomen, associated with nausea and vomiting, which always gives temporary relief. There has been much belching of very foul-smelling gas. For the last year the patient has noticed a constant painful area in the upper abdomen two inches below the sternum. In July, 1920, she noticed that she was losing weight. For the last six weeks the distress had been steadily increasing. In the afternoon of each day she began to feel bloated, and by nine or ten o'clock in the evening became so distressed that she would vomit. This always gave relief. The vomitus contained particles of foul-smelling undigested food. At no time had she noticed any blood in the vomitus. She had, however, noticed that on several occasions the stools were almost black. There was marked pyrosis for two or three hours after the evening vomiting. This was very sour, and caused a burning sensation in the pharynx.

Date and Mode of Onset of Present Attack. On the night of December 15th, 1920, she was unable to sleep because of a burning in the epigastrium. December 17th, 1920, there was a sensation as if "stomach were being drawn up in a knot," associated with very severe lumbar pain and nausea. At 4 a.m. on the morning of December 18th, 1920, the patient was awakened with a sudden severe pain in the umbilical region, to the right of the mid-line, radiating to the right scapula, At 5 a.m. there was an attack of severe vomiting associated with an extreme degree of shock. She was seen at 2.30 p.m. and admitted to hospital at 4.30 p.m.

Condition on Admission. Patient appeared extremely ill, was very pale, with the exception of a malar flush. The respiratory, nervous, cardiovascular and genito-urinary systems showed no evidence of organic change. There was one lymphatic gland in the left axilla enlarged to about three-quarters of an inch in diameter. Urinalysis was negative. White blood cells, 22,800; pulse, 100.

Abdominal Examination. There was very slight abdominal distention, but a very definite tenderness and diffuse rigidity over all the abdominal muscles. The point of maximum tenderness was situated to the right of the mid-line, two and a half inches above the level of the umbilicus. There was free fluid in the peritoneal cavity.

Diagnosis. Ruptured gastric or duodenal ulcer. Immediate operation advised.

Operation. 5.00 p. m. Forty ounces of normal saline were given interstitially into the axillary fossæ during the operation. The upper abdomen was opened by a near mid-line incision and a considerable quantity of cloudy fluid escaped. There were particles of fibrin scattered throughout the peritoneal cavity. The appendix was explored, showed evidence of former disease, and was removed. The stomach which was enormously distended, was palpated and no ulcer was felt. On the anterior surface of the first part of the duodenum was found a perforated ulcer, the aperture of which would admit a lead pencil. Around this perforation was an excessive amount of scar tissue, and there was a high degree of pyloric stenosis. A section was removed for histological diagnosis. After thorough cautery excision of the ulcer, the opening was closed by two rows of Lembert sutures, and reinforced by a free omental graft. A swab was made from the peritoneal content for culture. When the opening was closed it was found that there was practically complete pyloric occlusion. One was thus forced to do a posterior gastroenterostomy, despite the wide-spread reaction within the peritoneal cavity. This was done, after bringing a large area of the posterior wall of the stomach through the posterior layer of the lesser sac, and fixing it in that position. The abdomen was closed in layers, and a drainage tube inserted to the site of the perforation.

Subsequent History. The condition of the patient following the operation was extremely satisfactory, the temperature rising on one occasion only to 100·4°. The pulse rate remained over 115 for forty-eight hours, after which it gradually returned to normal.

Cultures B-4001, made from the swab taken from the peritoneal contents, were sterile in seventy-two hours in glucose broth and blood agar. The drainage tube was removed in twenty-four hours; no drainage occurred at any time, the wound healing by primary union. The histological report S-2453, concerning the section of the ulcer, showed evidence of extreme fibrosis, and an acute inflammatory reaction, but no evidence of malignancy.

The recovery has been most satisfactory, and on discharge, January 12th, 1920, patient appeared to have complete relief from gastric symptoms.

Comment. (Dr. Roscoe R. Graham.) There are several points in this history which are of great interest. In the first place, there was a definite history of gastro-intestinal disorder for twenty-four years—since eighteen years of age. Many individuals past forty years of age have been observed suffering from chronic abdominal disease, from these could be elicited a discontinuous history of their disability, which began prior to their twentieth birthday. This would indicate that during the stage of vigorous early adult life, the body can make compensation for disabilities which, when associated with the inevitable degenerations found later in life, compels it to seek medical or surgical aid. In this instance there was a discontinuous history of a gastric disability, existing practically unchanged for twenty-one years. The last three years of the disease had, however, been characterized by definitely increasing symptoms. In the first period of twenty-one years, vomiting was not a marked factor, but occurred only occasionally. The pain was of a dull, aching type, and caused by the stimulus of the ulcer through the sympathetic nerves. However, during the last three years the intervals between the attacks had become shorter, and the attacks had not lasted so long, but were always accompanied by severe nausea and vomiting, which constantly gave temporary relief.

This leads one to believe that the cause of the exacerbations was an inflammatory reaction at the site of the ulcer. The reason for the attacks occurring more frequently, and lasting for shorter periods, can be sought for in the degree of obstruction which was constantly present as a result of the large amount of fibrous tissue proliferation. Thus around the ulcer, a much less severe inflammatory change would cause a degree of obstruction which would result in nausea and vomiting. This, in turn, would necessitate abstinence from food—and a rapid subsidence of the inflammatory reaction in this area, with a consequent relief of the obstruction.

The symptoms during the last year have differed from those of the two preceding. There was a constant painful area in the epigastrium, just below the sternum. This was interpreted as peritoneal irritation, the result of ulceration, with destruction of all the muscle layers, leaving only the peritoneal coat to prevent a complete perforation. This activity at the site of the ulcer stimulated a further increase in the proliferation of the connective tissue, causing a progressive pyloric stenosis, which was evidenced by marked loss of weight in July of 1920.

During the six weeks preceding operation there developed a rapidly progressive, pyloric obstruction, characterized by pain occurring constantly in theafternoon, and followed and relieved by vomiting at night, the vomitus showed that very little was leaving the stomach, as it contained much foul-smelling and undigested food.

With such a preceding history, it was only logical to expect an acute perforation. The important point to remember in the diagnosis of acute perforations is that after the initial shock subsides, the patient may be fairly comfortable, with a slow pulse rate and normal temperature, but the muscular rigidity will be persistent. The value of the absence of liver dulness as a sign of perforation is of doubtful value, as it is very often absent, and would thus be misleading. The presence of free fluid is of very real value. As to its source, there is room for discussion. Personally, we feel that most of it is inflammatory exudate, rather than contents of the stomach or duodenum, the exudate being the result of a chemical, rather than a bacterial irritation of the intra-peritoneal contents. That this hypothesis is correct is borne out by the fact that in this instance when operation was performed thirteen hours after perforation of the ulcer, the culture of the peritoneal exudate was sterile. However, if this irritation persists long enough, there results an inflammatory reaction of the large bowel, of sufficient severity to allow colon bacilli to leave the lumen through the wall, with the exudate, and this results in a severe general bacterial peritonitis, with the colon bacillus as the ætiological factor.

This conception of the pathology was of extreme practical importance in this case. When the perforation was closed, the pylorus was occluded. If we felt the exudate was bacterial, we would not have done a posterior gastroenterostomy, but would have done a jejunostomy until the acute lesion subsided, and then at this later date would have performed an anastomosis between stomach and jejunum. Such a procedure compares very unfavourably with the one adopted. This also emphasizes the needlessness of multiple drains, when the operation is done prior to the development of a peritonitis due to the colon bacillus.

That the histological report shows no evidence of malignancy is quite in accord with the fact that primary duodenal carcinoma is an extremely rare disease.

CONCLUSIONS

1. The free intra-peritoneal fluid found after perforation of gastric or duodenal ulcers is largely inflammatory in origin, rather than coming from the lumen of the stomach or duodenum.

2. This fluid is sterile until infected with colon bacilli, and does not become infected for some hours after perforation, as in this instance it was sterile thirteen hours after the occurrence of the perforation.

3. Following the initial shock of the perforation, all the symptoms and signs of a severe intra-abdominal lesion may be absent for some hours, with the exception of muscular rigidity and localized tenderness on palpation.

4. Drainage can be eliminated in operations done before the onset of a bacillus coli peritonitis, only rarely present within six hours of the occurrence of the perforation.

5. Gastro-enterostomy should be done if possible at the time the perforation is sutured, provided the patient's condition warrants it.

6. A large area of stomach should be delivered through the posterior layer of the lesser peritoneal sac, and sutured to it, before doing a posterior gastro-enterostomy, in individuals with dilated atonic stomachs resulting from a high degree of pyloric obstruction. This avoids disaster when the stomach returns to its normal size.

Editorial

THE REORGANIZATION OF THE CANADIAN MEDICAL ASSOCIATION

JUDGING from the universal appreciation expressed at the Halifax meeting, the enlargement of our Journal has evidently been gratifying to our readers, and now in view of the abundant material for publication, we are promising a still further increase in its size and are looking for much greater scope in our work.

With a view to placing the Association on a broader foundation, and one that will be national in its sphere of influence, the Association has accepted the suggestions of its Executive Committee and plans for extension and reorganization have been adopted.

The first great step in this movement has already been taken by the creation of one Canadian Medical journal in which every Province is cooperating, and for which we expect the whole Canadian profession to lend its unstinted aid.

The time has arrived when the second move can now more easily be taken, and the Association engaged on a campaign of much wider scope.

The Association may and should render valuable service to the state, to the profession and to the individual by undertaking to guide aright both the State and the individual in matters medical. Before this can be attained a better organization is essential and it is for this reason that at the recent meeting at Halifax two important steps were taken:—

First, the creation of a bonded endowment fund, to which every member of the profession is invited to subscribe, each bond to be valued at $100. and yielding 5 per cent. interest.

Second, the increase in the annual dues of the Association from five to ten dollars. Without this increase the Journal cannot maintain a satisfactory standard, nor, indeed, can it possibly live in its present form. For many years in the past, the members of the profession in Montreal, have personally assumed this financial responsibility, but the time has now come for the whole profession to give its help, and thus secure the permanency of a national medical journal.

Furthermore, a full-time and well-paid secretary will be appointed just as soon as funds are available, while in order to ensure promptness in the plans of re-organization, our Associate Secretary has already been instructed to visit some of the Provincial medical associations for the purpose of carrying on the propaganda of the parent organization.

It will be the policy of the reorganized Medical Association to aid in the progress of things medical, both for the legislatures, for the profession, and for the people, and it is the duty of our Journal to carry out this programme in every legitimate way that is possible.

SUGGESTED REFORMS IN THE CANADIAN MEDICAL ASSOCIATION

QUITE apparent at the Halifax meetings was a healthy spirit of discontent, a discontent that is insistently calling for a proper analysis of conditions as they now are, but which at the same time gives one the hope that the physicians of the Dominion may yet see what they are beginning to demand—a great national association, well organized in itself, and in touch with national questions and conditions.

The committe on reorganization, the editorial boards, the executive and the members at large, while holding many and various views on different questions, are agreed that upon three points immediate action must be taken if the association is to pretend to exist as an active organization.

These points are:

1. The proper use of the Journal columns for the furthering of the Association's needs.

2. An immediate enlargement of the Journal.

3. The appointment of a whole time salaried secretary.

It was asserted in the general session that as yet in the re-dressed, rearranged journal, no word of a progressive policy, helpful to the association has been seen, the profession very rightly feel that the journal of the association exists primarily for this purpose and insist that without a foundation of policy, organization, and consolidation, no journal of a national association can be said to be fulfilling its purpose.

It was further stated that an enlargement of the journal was an urgent need if the provinces are to have room. This brought to light again the fact that a debt of several thousand dollars is still being carried, a debt which hampers all effort at readjustment or expansion. **On the lifting of this load may be said to depend the continued existence of the journal.**

For the settling of this matter, and for the arranging of the detail of the third point—the salary of the whole time secretary—a fund must be raised, and the profession, if concerned as to the future of their association and its publication, will in their turn listen to an appeal, an appeal, urgent no doubt but one intimately connected with their interests.

Two plans were suggested and will be acted upon.

1. The raising of the annual dues.

2. The issuing of the Canadian Medical association of $100.00 bonds or shares bearing interest at 5 per cent.

The first plan affects one and every member of the Canadian Medical Association and we ask them to consider for a moment, that, as compared with other national organizations our membership is small and advertising possibilities few.

The second plan, formulated in executive session, at which nearly $2,000.00 was subscribed, calls for the issuing of $100.00 bonds or shares paying 5 per cent.

If the Canadian Medical Association is to exist as a real organization, capable of carrying out a broad policy and exerting a nation wide influence, it must have the appropriate machinery, the motive power of which machinery can never be anything else than a properly paid whole time secretary working with the aid of the journal columns.

To place the Canadian Medical Association where it belongs, in the van with the other national associations, a real re-organization is thus being urged. This re-organization must include provision for a salaried official and an enlarged journal with a broadened policy; support should not be asked for any plan lacking in these essentials of business management, and we are begging the profession to look kindly on the question of raising the dues and to encourage the bond issue only because we feel that the plans suggested look like a rational way of meeting a serious problem.

O. E. B.

THE VALUE OF RURAL MEDICAL CENTRES

THE value of rural medical centres equipped with means for carrying out all the more important diagnostic measures which may be demanded nowadays by physicians, has been placed before the profession by Dr. Victor C. Vaughan of the University of Michigan in a paper read at the annual congress on medical education held recently in Chicago.

At the beginning of his address, Dr. Vaughan called attention to the number of valuable contributions to scientific medicine, which had been made during the earlier half of the 19th century by rural practitioners. In illustration he mentioned among others the well-known work of William Beaumont on the stomach carried out on the island of Mackinac and the surgical advances made by Ephraim McDowell with his first ovariotomy, and Marion Sims devising the first successful treatment of a vesicovaginal fistula. In those days the armamentarium of the physician was simple and easily obtained; medical books were rare; but scattered through the profession in rural as well as in urban districts were well educated men, trained to be careful observers as well as clear thinkers. During the past fifty years these conditions have been gradually altering. For advanced work and research of all kinds, an expensive laboratory with specially trained workers is a necessity, and the physician who desires to do scientific work of a high character must remain in a medical centre where such facilities can be obtained. The country physician falls behind his city brother for lack of such opportunities. The result is shown in a lessening death rate for large cities, but an increasing rate for rural districts. In 1900 the annual death rate in cities in which exact statistics are available was 17.4 per cent.; while in rural districts under similar conditions the death rate was only 14.1 per cent. In 1917 the death rate in cities had fallen 2.3 per thousand, while the death rate in rural districts had increased 0.6 per thousand. Dr. Vaughan states that these figures are conservative, and that more telling figures could be presented were he to deal with the mortality rates of some specific diseases. He considers that there is ample justification for both the country practitioner and his patients to demand improved facilities to be supplied by the State to enable him to carry out work of a high character. This can be done best by the establishment of rural medical centres. Such medical centres should be equipped with every scientific facility to enable every legally qualified physician, whether in the city or in the country, to carry out all diagnostic procedures necessary for a correct determination of the causes of disease, and to assist in the treatment. Associated with such a laboratory there should be a well selected library and the more important current journals. To supply these needs which are out of the reach of the rural practitioner, a community, the boundaries of which may or may not be determined on country or municipal lines, should have the authority on a majority vote of its citizens to equip and maintain such a medical centre with or without hospital privileges in which every physician in the community can have all facilities necessary for the elucidation and study of the diseases he may meet with. Such a medical centre should contain the more important medical journals, and be able to obtain the loan from some large library of any book or journal which might be desired. If in association with a hospital, such a medical centre could serve as a graduate school, and scientists and specialists could be called to its wards and laboratories to give instruction in any new advance. Such a hospital would enable any rural community to carry on, not only valuable scientific observation on many phases of disease, but once more place the rural physician in a position to make definite additions to our knowledge, and give him an equal chance with his urban confrere to grow in knowledge and skill.

Abstracts from Current Literature

SURGICAL THERAPEUTICS

Acidosis in Operative Surgery. Farrar, Lilian. Surg. Gynec. and Obst., April 1921, Vol. 32, P. 328.

Recently an attempt has been made to use the theory of acidosis as an indicator of impending shock during operation. By acidosis is meant a general impoverishment of the body bases, so that the body as a whole shows some systemic abnormality. Carbohydrates are the main base forming foods. Fats may also be counted on, but only in the presence of carbohydrates. In proteins are found the acid forming foods.

It has been found that the bicarbonates of the blood are the carriers of the acid products to the lungs and are the main factor in maintaining the acid base balance of the body. During operation the alkali reserve is usually reduced, and if sufficiently so, will ultimately result in acidosis with its associated condition shock. This state is more common in women because the range between the normal limits of the combining power of the blood for carbon dioxide is much shorter than in men.

In order to offset the condition, 20 per cent. glucose solution has been administered intravenously with very encouraging results. Glucose has many advantages over other solutions used for the same purpose. For a patient weighing 150 lbs. 260 Cu. Centimeters are given per hour during the operation Glucose is also used in the cases of extreme vomiting found either after operation or in pregnancy with very beneficial results.

As it had been found that the fall in blood pressure bears a close relation to the fall in the alkali reserve, attempts were made to discover some material which would maintain the pressure without the necessity of too large a volume. A colloid was found which proved of some value. Gum Acacia in 6 per cent. solution was added to the 20 per cent. glucose solution.

Carbohydrate feeding before and after the operation, together with the use of bicarbonate of soda will do much to lessen the risk of acidosis.

G. A. F.

ANAESTHESIA

The Cause of Death from Nitrous Oxide—Oxygen Anaesthesia. Baldwin, J. F. Med. Rec., Feb. 12th, 1921, P. 266-267.

Attention is drawn to the frequency of death under nitrous oxide and oxygen. In Columbus, Ohio, the writer states, the mortality in administrations for major anaesthesia was one per cent.

Dr. Dennis E. Jackson (Professor of Pharmacology in Washington University Medical School) is quoted as stating that any direct action on the heart during gas and oxygen anaesthesia is due to lack of oxygen and hampered excretion of CO2. The principal effect is probably stimulation of the cardio-inhibitory centre in the medulla. Ventricular fibrillation, due to vagus stimulation, may be the cause of death, after the manner which Levy has described for chloroform.

Another factor may be central respiratory depression, due to the depressing effect of the gas, coupled with excess of carbon dioxide and lack of oxygen.

He doubts the possibility of death under gas anaesthesia without the element of asphyxia.

W. B. H.

Blood Pressure Guides during Anaesthesia and Operation. Miller, Albert H. Am. J Surg., April 1921, P. 34.

Miller states that the avoidance of the condition known as shock depends largely on the presence of favourable factors in the surroundings of the patient during operation. Among these are smooth light anaesthesia, suitable temperature and proper position with the avoidance of anything which may tend to hamper respiration.

The blood pressure in stout patients, especially those with damaged hearts, is easily affected by changes in posture. If the respiration is obstructed the systolic pressure is increased, sometimes as much as 50 mm, with little change in the diastolic. If the obstruction persists there is a steady fall in both systolic and diastolic pressures.

Too low a temperature in the operating room with exposure of viscera is associated with a rapid fall of blood pressure. A drop, usually but not always transient, is associated with the application of heat or cold to extensive visceral or muscular surfaces or with irrigation of the body cavities with hot solutions.

A considerable drop of blood pressure sometimes follows a change to the Trendelenburg position. In one of the writer's cases a patient who had undergone amputation of the breast was propped up into the sitting position and immediately died. As a result of the administration of the anaesthetic there is frequently a preliminary rise sometimes as much as 30 mm. Within twenty minutes it has gone back to the usual level.

Profound anaesthesia is accompanied by a marked decline affecting systolic, diastolic and pulse pressures.

The importance of watching the blood pressure as a means of avoiding overdosage in cases of vital depression is emphasized.

W. B. H.

INTESTINAL TRACT.

Acute Intestinal Obstruction. Finney, J. M. T. Surg. Gynec. and Obst. May 1921, Vol. 32, P. 402.

The writer based his report on 245 cases. Only in two conditions, intussesception and volvulus, did age play any important role. The former occurred almost invariably under one year, while the latter appeared after middle life. The ratio of male to female patients was 2½ to 1. The mortality was high, being 36 per cent. and depended almost entirely on the length of time which elapsed between the onset of symptoms and the time of operation.

Those cases operated upon within 12 hrs. showed a mortality rate of 5 per cent. This rate doubled in the second 12 hrs. In the second 24 hrs. a striking advance in the rate to 31 per cent. took place. The result appeared to depend more on the condition of the patient at the time of operation, than the nature of the operation performed.

A very interesting finding was that 40 per cent. of the total number had had some form of abdominal operation previously. Pelvic operations, especially for inflammatory conditions, are followed by a very high percentage of intestinal obstruction.

In many cases a definite diagnosis is very difficult owing to the number of conditions which may simulate it at times very closely, such as, Typhoid Fever, Henoch's Puvpura, pancreatitis, angioneurotic oedema, the twisted pedicle of a tumour, lead colic, gall-stones, mesenteris thrombosis, diaphragmatic pleurisy, etc. The passage of the stomach tube in doubtful cases may furnish valuable information as to the character of the stomach contents and so help materially in the diagnosis.

Of the symptoms, pain is the most constant, being noted in 83 per cent. Usually appearing early it may be at first "colicky" later to become more severe and continuous. Nausea and vomiting were present in 80 per cent. of the cases. Constipation is usually present but may be preceded by one or more movements thus emptying the bowel below the obstruction.

Distention and visible peristalsis are usually late manifestations. Tenderness is only exceptionally a marked feature. G. A. F.

Enterostomy in the Treatment of Acute Intestinal Obstruction. Summers, John E. Surg. Gynec. and Obst. May 1921, Vol. 32, P. 412.

Nelaton, in 1858, was the first surgeon to practice enterostomy successfully, in the treatment of acute intestinal obstruction.

He made a small incision in the right iliac region and sutured the first coil of distended intestine which presented itself. The next improvement was the use of Paul's glass tubes. These could be removed without necessitating a further closure operation. Bonney in 1910 advised the opening of the jejunum, as he believed this to be the segment of toxicity. The author recommends that the drainage tube be introduced into the highest segment of the bowel that is distended and not into the highest part of the jejunum if not distended. The coils farthest away from the obstruction are heavy and contain much liquid, those nearest the obstruction are light and contain mostly gas.

The writer is of the opinion that the high mortality in acute intestinal obstruction can be greatly reduced if the principle of a properly performed and located enterostomy can be carried out. G. A. F.

The Toxic Agents Developed in the Course of Acute Intestinal Obstruction and their Action. Stone, H. B. Surg., Gynec. and Obst. May 1921, Vol. 32, P. 415.

It has now been definitely proven and accepted that the seriousness of acute intestinal obstruction is due to the presence of toxic material in the obstructed loop of the bowel. The absorption of this material causes all the characteristic symptoms. Normal mucosa of unobstructed bowel will not absorb this material. Several theories are advanced as to how this is accomplished. The formation of the toxin has given rise to some controversy. One school believes that the mucosa, from some perversion of its function, under obstruction conditions, is the source, while others contend that it is due to bacterial activity plus necrotic tissue. The exact nature of the toxins has also been a matter of dispute. All are agreed, however that these substances are derived from the splitting of protein molecules. G. A. F.

Obstruction of the Colon and Ileocaecal Region. Peck, Chas. H. Surg. Gynec. and Obst. May 1921, Vol. 32, P. 408.

The author reviewed 138 cases of obstruction which occurred between the terminal ileum and including the sigmoid. Of this group 35 were malignant. The ascending colon, hepatic flexture and sigmoid were the most frequent sites. Excision is recommended in cases where the growth is reasonably movable and the metastases, if any, accessible. Where distention of the proximal gut is marked preliminary colostomy should always be performed. End-to-end anastomsis appears to give the best results. Palliative colostomy should be deferred as long as possible, where no radical operation is advised.

The non-malignant cases, of which there were 103, were caused by peritoneal and omental bands.

The writer believes that many of the post-operative adhesions are no doubt due to iodine which is carried into the abdomen on the hands of the operator. Careful towel protection to the wound edge and frequent rinsing of the hands should eliminate this danger. Many of these cases due to peritoneal bands will cause an obstruction as complete as any malignant growth. Division of bands is usually followed by complete recovery. Following inflammations in the right iliac fossa, the omentum is likely to be found bound down in that region. As these bands shorten they drag on the transverse colon causing considerable pain which may predominate over the symptoms of obstruction. G. A. F.

The Operative Treatment of Fissure in Ano. (Zur Operatisen Behandlung del Analdfissuren). Polyx. Zentralblatt f. Chir., Feb. 1921, No. 7, P. 222.

The author excises the fissure in ano, with or without haemorrhoidal tag if present, by two semicircular incisions, the lower incision along the muco-cutaneous border of the anal orifice, and the upper extending as high as the upper limit of the fissure. The edges are united with catgut.

The patient is up on the second day and in the course of 8—10 days the condition is cured.

The operation when possible is performed under local anaesthesia. A. B. I.

UROLOGY.

Tumours of the Kidney. Hyman, A. Surg. Gynec. and Obst. March 1921, Vol. 32, P. 216.

Dr. Hyman reports forty cases of renal tumours. Twenty-eight of these were hypernephromata, eight mixed tumours of Wilms, two adenocarcinoma, one papilloma of renal pelvis, benign in character, one an gioma of the renal pelvis. The proportion in these series closely coincides with those reported by others.

The tendency of hypernephromata to form metastases early or late, with or without clinical evidence of renal disease is not uncommon. There is a pecular tendency of the tumours to grow into and extend along the renal vein. Haematuria is the most frequent initial symptom, then pain and finally tumour.

Haematuria is often transient and intermittent. Pain is of two types—one, colic from blood clot passing down the ureter, the other, lumbar in position, dull or neuralgic. Tumour is noticed in 60 to 80 per cent. of the cases.

Symptomatic variococele on the side of involvement which does not disappear on lying down has been emphasized by some but not observed by the author.

Urinalysis is most important. Cystoscopy, comparative renal function, general renal function and pyelography cannot be omitted. Radiography of practically the whole body must be done to exclude metastasis in bone or lung. Stone is not infrequently found; tuberculosis and pyogenic infection can usually be excluded. Haematuria is usually more pronounced and recurs at more frequent intervals.

Nephrectomy is the only treatment, providing there are not metastatic lesions. Depending on the size of the tumour, a lumbar or trans-peritoneal operation is done.

The course of the disease is slow up to a certain point and then increases in rapidity with associated signs of malignancy. Hypernephromata occur most frequently in the fourth and fifth decades.

Wilms mixed tumours occur in childhood, most commonly before the third year; although cases have been reported in adult life. They are exceedingly malignant and show little difference in the clinical manifestations except a tendency to greater haemorrhage.

Adenocarcinoma is rare. The course of the disease is more rapid and the tumour much more malignant than hypernephroma.

The pain is very constant and severe; bleeding is more profuse and frequent.

Tumours of the renal pelvis are rare. Papilloma, benign or malignant and angioma are types met with. The symptoms are those of other renal tumours. The diagnosis is seldom possible unless tumour cells are found in the urine. The presence of vesical tumour with renal haematuria is characteristic. Pyelography demonstrating pelvic distortion and irregularity should be of considerable importance in the diagnosis.

In conclusion Dr. Hyman emphasizes the extreme malignancy of kidney tumours. He reports eleven out of twenty-eight inoperable. Twenty-seven nephrectomies were performed with two operative deaths. Twenty-three and one-third per cent. passed the three and one-half year period after operation and were apparently cured. Fifty-eight per cent. died within two years from metastasis or local recurrence. The only way to offset this mortality is early diagnosis and nephrectomy and more careful investigation of haematuria. R. E. P.

Aspiration of the Bladder. (Dangers et Inutilite de la Ponction Capillaire Aspiratrice de la Vessie) De Berne-Lagarde, R. and Ramos; **J. d'Urol. Med. et Chir.** Vol. 10, No. 2, P. 107.

The dangers of aspiration of the bladder for the relief of retention of urine in the bladder are haemorrhage into, or infection of the pre-vesical space, extravasation of urine and injury of the peritoneum, an accident which occurs more frequently than is generally recognized.

Cases are reviewed in which the procedure had been carried out and in which operation had to be performed later in the Necker clinic for complicating infection and haemorrhage. One was the case of a soldier who had fallen across a cement embankment in a trench, and suffered a rupture of the urethra. For the urinary retention which followed, three vesical punctures were made, the last of which brought away only blood. On doing an emergency cystotomy they found a large pre-vesical haematoma, and on the anterior wall of the bladder, at the spot of the puncture, they found a spurting artery which had been wounded by the aspirating needle. In another case, a prostatic, in whom, after ineffectual attempts at catheterization, the bladder was emptied by aspiration, a quantity of urine was found infiltrating the pre-vesical space. In the anterior wall of the bladder was revealed a circular orifice through which urine was oozing into the space of Retzius.

The authors point out that with patience and the selection of the proper instrument, it is nearly always possible to catheterize patients suffering from prostatism or urethral stricture, the class of case usually subjected to the practice. The remark of Guyon is quoted that hardly once a year does a case present itself in which catheterization is impossible by ordinary methods.

In case it is impossible to catheterize, it is better to perform at once an emergency cystotomy, which will serve as the first of a two stage operation. F. S. P.

Abscess of the Prostate. Kretschmer, Herman L.; **Surg., Gynec. and Obst.,** March 1921, Vol. 32, P. 259.

The paper is based on forty-three cases. It is pointed out that abscess of the prostate has always been looked upon as a complication of gonorrhoea, but cases have been reported following acute infections and are of much more frequent occurence than we have been led to believe. He groups his cases:

1. Following or complicating gonorrhoeal urethritis;
2. Metastatic abscesses;
3. Abscess following trauma, e.g., instrumentation;
4. Abscess associated with hypertrophy of the prostate;
5. Abscess associated with urethral stricture;
6. Abscess associated with appendicitis;
7. Abscess associated with stone;
8. Abscess with undetermined aetiology;
9. Abscess and general sepsis.

Of the forty-three cases, thirty gave a history of Neisser infection, recent or remote. The gonococci were demonstrated in sixteen cases; thirty of the cases showed urethritis; eleven cases showed a positive gonorrhoeal fixation test and the gonococcus was demonstrated in all of these.

Examination of the pus from the abscess showed gonococci in eighteen, staphylococci in five; streptococci in one; both staphylococci and streptococci in two, and b. coli in one;

Metastatic cases, two in number; one showed a felon of the finger, the other a boil of the neck;

Abscess following instrumentation. Of these there were seventeen in number, five were gonorrhoeal, and twelve non-gonorrhoeal;

Abscess associated with benign hypertrophy of the prostate. They were three in number;

Abscess associated with urethral stricture was found in one case;

Abscess following acute appendicitis occurred in one case, thirty-one days after appendectomy—venereal history denied;

Abscess with calculi in prostate occurred in one case, was diagnosed by rectal examination and confirmed by X-ray.

Abscess in which the etiology was not determined include the remainder of series and every means to exclude infection of the genito-urinary and other systems was carefully taken;

The symptoms of prostatic abscess usually incorporated frequency of micturition, thirty-four out of forty-three cases;

Pain was present in thirty-six cases; some cases showed suprapubic pain associated with full bladder and relieved by emptying the bladder. Perineal pain was present in only eleven cases. Twenty-two cases showed pain during or after micturition. Retention of urine occurred in fourteen cases. Difficult urination was found in twenty-three other cases.

Rectal symptoms occurred in twenty cases and were described as painful defaecation or sense of fullness in the rectum;

Chills and fever were present in nineteen of the cases.

The rectal findings showed well-marked prostatic enlargement and tenderness, although fluctuation was not present in the early stages.

Three possible terminations of prostatic abscess are: resolution, rupture or operation. Four cases went on to resolution, nineteen cases ruptured into the urethra either spontaneously or after rectal examination, one case pointed into the ischio-rectal space, and it is thought that this case was not a true abscess of the prostate, but a peri-prostatic condition or phlegmon.

Sixteen cases were operated upon, one through the rectum by family physician with good recovery. The others were done through the perineum, care being taken to break down all pockets and ensure thorough drainage. Operation and drainage does not cure, and the case should be treated until prostatic strippings are pus and infection free. R. E. P.

The Young-Stone Operation for Urethro-rectal Fistula. Davis, Edwin G. **Surg., Gynec. and Obst.** March 1921, Vol. 32, P. 225.

Dr. Davis reports 14 cases of urethro-rectal fistula, the result of perineal lithotomy, drainage of prostatic abscess or perineal prostatectomy.

The diagnosis is simple; passage of gas "per urethram" and urine "per rectum", coupled with a history of a perineal operation, leaves little doubt as to the condition.

Rectal examination usually reveals a definite fistula, seldom more than three or four millimeters in length.

The operative technicque consists, firstly in super-pubic cystotomy; secondly in a racquet shaped incision from mid-perineum backwards encircling the rectum at the muco-cutaneous opening; thirdly, dissection of the rectal mucosa as in Whitehead's operation. The separation must be carried backwards until the prostate is exposed and until one is assured of sufficient rectal mucosa, so that the fistulous track can be amputated with the lower rectal mucosa and the lower end of the rectum brought down to perineal skin without tension.

A plastic repair is done by bringing the levator ani muscles well together in the midline.

Thirteen of the fourteen cases were successful and all had been objects of several failures with other methods. R. E. P.

SURGERY OF THE EXTREMITIES

Habitual Dislocations. Discussion at the Meeting of the Subsection of Orthopaedics of the Royal Society of Medicine. **Brit. M. J.**, March 12th, 1921.

Mr. Laming Evans (the President) pointed out that such dislocations were by far the most common in the shoulder-joint, partly because 50 per cent. of all dislocations occurred at the shoulder, partly because of unskilled reduction, defective after-treatment, and because of lesions inflicted by the original injury. Methods of treatment were (1) palliative, by mechanical appliances (2) physiological increase of tone in muscle and ligament (3) reefing operation upon the capsule, by plication or by excision and overlapping (4) repair of ruptured tendons and musculotendinous insertions and (5) muscle transplantation i. e. the deltoid. The posterior portion of the deltoid had been passed underneath the neck of the humerus and fixed in front, with considerable success. Whether the transplanted portion retained its contractility was a debated question.

Mr. T. H. Openshaw spoke of curing ten cases by dividing the subscapularis, which by over acting was in his opinion the cause of dislocation.

Mr. W. Rowley Bristow in discussing habitual dislocation of the patella said that the operative procedures were (1) correction of knock knee if present (2) pleating of the capsule on the inner side, which he thought bound to fail (3) shortening the quadriceps (4) alteration of the line of pull of the quadriceps by transplantig half or whole of the patella tendon to the inner side.

He further suggested that the bringing forward of the external ridge in the outer condyle was a rational surgical procedure, in connection with transforming part of the tendon of the patella. J. A. N.

Habitual or Recurrent Dislocation of the Shoulder. 44 Shoulders operated in 42 patients. Turner, Thomas T. Surg., Gynec. and Obst., April 1921, P. 291.

The writer states that his paper is to show that "the axillary capsule operation is the most rational and most successful, but that it is also anatomically almost impossible". Various difficulties in various approaches to the shoulder joint for capsulorrhaphy are discussed, and the point is made that it is better to have too much stiffness than too much movement after the operation, as the former can be overcome and the latter leans to a redislocation. The objection to the usual delto-pectoral approach is that it is too far out to get a good exposure of the capsule at the point of laceration, which is antero-inferior. The posterior axillary route, of which excellent illustrations are given, gives him the freest capsule exposure just where the variations in the joint lesion are best detected. One must beware of the circumflex nerve.

In cases of incurable redislocation the head of the humerus is excised at the level of the anatomical neck, removing the part of the bone which dislocates. J. A. N.

Loose Bodies in Joints. Fisher, A. G. T. Lancet, April 23, 1921, No. 5095.

The writer classifies his subject under three headings: Group 1—Loose bodies, generally broken off osteophytes, occurring in connection with pathological joint processes such as osteo-arthritis, tabes, tuberculous disease and acute arthritis. In Group II—are loose bodies occurring in joints otherwise apparently normal, and in general having the appearance of detached portions of the articular surface. This detachment is thought to be due to trauma rather than to disease. In Group III—he places synovial chondromata of various kinds.

Case reports illustrating various types are given. An interesting section deals with the condition met with in Group II, where a loose body, usually solitary, arises by detachment of a portion of the articular surface, including bone. This has been thought to be due to"quiet necrosis" or "osteochondritis dessicans", but Mr. Fisher's observations and experiments show that the detachment is more likely due to trauma, particularly to a pull upon the crucial ligaments.

Removal of loose bodies in joints is of course indicated, even in the case of the bodies in osteoarthritic subjects. J. A. N.

When to Open Knee-joints. Marshall, H. W. **Boston M. and S. J.,** March 24, 1921.

A rather long article in which aspects of joint disease and injury are discussed. The writer's conclusions regarding arthrotomies for synovitis are:

1. Arthrotomies are generally harmless when done by skilful surgeons. Patients are placed conveniently for efficient control of other steps in treatment when they are in hospitals, and excellent recoveries are the rule in instances of non-purulent synovitis.
2. Early arthrotomies are unnecessary as well as harmless in non-purulent cases.
3. Arthrotomies performed during later stages of slowly subsiding chronic knee inflammations of considerable severity possess distinct advantages.

In villous arthritis operations are performed with benefit in many instances and at all stages. Patients' occupations and positions in life, as well as severity and chronicity of symptoms, hold an important place in determining what shall be done.

Tuberculous knee joints in adults should be excised as soon as definite diagnosis is made. J. A. N.

Reconstruction Surgery and its Application to Civilian Practice. Starr, Clarence L. **Surg., Gynec. and Obst.,** April 1921.

Dr. Starr in this long and interesting paper covers a great deal of ground. He condemns too extensive bony "debridement" in compound fractures, and points out that mild sepsis is a stimulant to bone granulations rather than a source of non-union.

The treatment of a non-collapsible bone cavity by its conversion into a saucer-like one filled with a muscle flap is advocated. The inlay bone graft (homogeneous) has proved more satisfactory, the fitting to be done by the single rather than the twin saw. In many cases a graft of diamond shape sprung in between cleft bone-ends does very good service.

It would seem almost unnecessary to suggest that in no instance can a steel plate screwed to bone fragments across a fibrous non-union ever result in union, and yet one still sees instances where such an operation has been performed.

Much reconstruction surgery is preventible, and if a joint is to be ankylosed there are certain positions in which an ankylosed limb is most useful. These positions are gone into fully.

The technique of shoulder arthrodesis by the writer's method is given. The restoration of function in cases of irreparable nerve injury by means of tendon transfer is discussed, and the procedure for wrist and finger drop from musculospiral paralysis elaborated.

Nerve suture is discussed, the writer pointing out that he has seen no case of recovery where gaps have been bridged either by nerve graft or by strands of fascia, catgut, etc. J. A. N.

A Preliminary Study of the Aetiology of Osteomalacia in the City of Bombay. Hutchison, H.S. and Patel, P. T. **Glasgow, M. J.,** April 1921, Vol. 95.

The writers divide the various classes of the Bombay Community into Mahomedans, Hindus, and other classes. Women only are concerned, as in India osteomalacia is practically never seen in men. Mahomedan women as constrasted with Hindu women, of the middle and upper classes are strictly purdah, i.e. they do not appear unveiled in public, and practically never leave their houses during the day. Their houses are ill ventilated. The large preponderance of osteomalacia among Mahomedan, as contrasted with Hindu women, proves definitely that lack of fresh air and exercise—the result of the purdah system—is by far the most potent factor in the production of the disease. There is no evidence to show that dietetic deficiency is a cause of osteomalacia, as the disease is not uncommon among the wealthiest classes of the community; while among the poorer classes the deficiency of animal fat in the diet is common to all.

There is no reason to believe that child marriage and prolonged lactation are important factors. The more or less sudden onset associated with fever in many cases and the rapid softening of the bones suggest a possible infective condition.

It is to be noted that the osteomalacia studied in this article is largely confined to the bones of the pelvis and makes its presence known through difficult child birth.

J. A. N.

Epicondylitis Humeri. Carp, Louis. **Surg. Gynec. and Obst.,** March 1921, Vol. 32, P. 257.

In this article the condition known as epicondylitis humeri or tennis elbow is described. Usually traumatic in origin, the main point in its symptomatology is pain and tenderness in connection with the external condyle of the humerus. X-rays are usually negative, and treatment seems of little use. It seems self-limited, and in one series of cases the average duration was 6 weeks. The aetiology is doubtful, though strain as a cause is favored by most writers.

J. A. N.

RADIOLOGY.

Radium, Its Use in Medicine. Gann, Dewell, Jr. **Urologic and Cutaneous Review,** October 1920, Vol. 24, P. 563.

Occurrence. Chief supply in America from Carnotite ores of Colorado. One gram of radium obtained from reduction of 350 tons of ore;

Salts. Metallic radium too unstable for therapeutic use, so its salts are employed for this purpose. Those commonly used are the bromide, the chloride, the carbonate and the sulphate. These contain respectively 53.6; 76.1; 79.0 and 70.2 per cent. of radium element;

Application. Two kinds of applicators employed; (a) flat applicators for superficial lesions, and (b) tube applicators for deep ones. A full strength flat applicator contains 10 milligrams of radium element spread over one square centimeter of surface. Tube applicators usually contain 25 milligrams radium element. In both varieties of applicators the alpha and beta rays are screened by glass and brass or silver capsules. Lead and rubber are also used. The gamma rays pass through with ease and are thus the only rays used in medicine.

Radium is also given internally by inhalation, by mouth, by subcutaneous and intravenous injection.

The application may be continuous or intermittent. Thus for a small epithelioma, a flat applicator may be applied for 6 to 8 days. The end results are the same in each case, but the continuous application causes much more severe reactions.

Action on tissues. In small doses it stimulates and in large doses it destroys tissues. Its destructive action is much more marked on malignant than upon normal cells. The rule is that the more rapidly growing and less highly specialized the cell (i.e. the more embryonic in type), the more it is affected by the rays. As the effect of the rays diminishes with the square of the distance they have to travel to reach their objective, it is necessary, in order to have all parts of a tumour treated with equal intensity, to (a) submit deep tumours to a "cross-fire" from several applicators imbedded in the tissues, and (b) place the applicators at varying distances from the surface of the body.

Reaction occurs from 1 to 3 weeks after exposure to the rays. Four degrees are recognized: 1. erythema; 2. erythema with desquamation; 3. vesication with superficial ulceration; 4. deep ulceration.

Microscopically, after a second degree reaction one sees: After 10 days the malignant cells become enlarged and vacuolized; the nuclei shrink and take a deeper stain (hyperchromatosis). Following these changes degeneration occurs rapidly; karyolysis and cytolysis are observed and phagocytosis is in evidence. The blood vessels show proliferation of the endothelial cells with complete blocking of their lumina; media and adventitia show hyaline degeneration. Coincidentally with the degeneration of the malignant cells there is a proliferation of the connective tissue and fibrosis results. The atrophy of the malignant cells and their replacement by fibrous tissue is complete in two or three months. The normal cells share to some extent in the above changes, but recover much more readily and completely than do the malignant cells.

Constitutional manifestations: These are not marked except in those cases which have received intensely heavy dosage. These develope headache, backache, nausea and vomiting. As a rule, cases have only slight nausea and a feeling of weakness. These appear from one to four days after treatment and pass often from 48 to 72 hours. H. C. M.

X-ray Radiation and Cancer. Morton, Reginald. **Brit. M. J.**, Jan. 29th, 1921, P. 172.

The author believes that radiation is more likely to provide cure for cancer than anything else. He advocates exact dosage with a sixteen inch spark gap and a filter of twelve millimeters of aluminium. The Coolidge tube is unsuitable for the treatment. At Erlangen the tube is standardized by biological methods and recalibrated at intervals. A 35 minute treatment is followed by redness in a week. No ulcer follows and tanning occurs after three weeks. This is the unit dose. Taking this as 100 a cancer cell requires 110 to destroy it; 70 to 90 will paralyze it, so to speak, as it may recover. A dose of forty stimulates it to increased growth. Six ports of entry are used for the uterus. This is not possible for breast cases which are treated at a long distance. The treatment may last from five to ten hours. In the Erlangen results dating back from 1918, 20 of 24 cases of uterine cancer are quite well. Since 1917, 75 per cent. of the mammary cases are clinically cured. A. H. P.

The Immunizing Effects of X-ray in Carcinoma. Johnson, F. Harnaman, **Brit. M. J.**, March 5th, 1921, P. 365.

The author replies to Dr. Morton's claims for the Erlangen method of treating cancer by x-rays. Neither quantity nor quality of x-rays in themselves guarantees success. X-rays act by local and general stimulation of the protective mechanisms of the body. It would be dangerous to operate after the Erlangen massive doses. The author advocates instead eight small doses distributed over three weeks. He believes that the x-rays act like vaccines raising the resistance of the patient to cancer invasion. The results of the Erlangen treatment are not convincing. The immunizing effects of x-rays are seen in tubercle and Graves' disease and he infers from his experience that there is an immunizing effect of x-rays in cancer. A. H. P

Treatment by X-rays and Radium. Knox, Robert. **Brit. M. J.**, Feb. 26th, 1921, P. 304.

X-rays are the best treatment for tinea capitis. In rodent ulcer radium is better than x-rays, as there is less frequent relapse after using radium. When it relapses there is resistance to second healing. Lupus vulgaris sometimes yields readily. Too much treatment of it exposes to the danger of lupus carcinoma. Hyperidrosis is readily controlled by x-rays. In leukaemia the immediate effect is striking and the control may go on for years, but the final result is nearly always relapse. Radium is better than x-rays also in Banti's disease. In exophthalmic goitre radium should be used. Simple inflammation of lymphatic glands and lymphadenoma quickly responds, so also with sarcoma, but with the latter, relapse occurs. With tubercle and carcinoma the response is slow. In fibromyoma of the uterus reduction occurs to half, or a third, but tumours never disappear. Great improvement, however, occurs in health from cessation of the haemorrhage. Some cases do not respond. In carcinoma of the breast he advises X-ray treatment before and after the operation. Some inoperable cases become operable after x-rays. A. H. P.

X-ray Treatment of Leukaemia. Richards, G. E. **The Journal of Radiology**, Vol. 2, P. 23.

Because roentgenologists and clinicians have not made the fullest use of X-ray therapy in treatment of leukaemia, the author submits his results in a series of 22 cases.

Having adopted the view that the disease is essentially a hyperplasia of the spleen and bone marrow, the technique of treatment is designed to depress the function of cells rather than to destroy cells.

The skin surface over the spleen is divided into areas four inches square, which are treated in rotation, one area each day. When the spleen has been covered, the long bones are then exposed in rotation with the same time interval. The dosage for each area is determined thus:—6-7" spark gap, through 2 mm. aluminum, 25 milliamp minutes at ten inch distance. This treatment is repeated at two-week intervals until the white blood count is stationary at ten to twelve thousand. Subsequent to this, "treatments are repeated at intervals of one month during the remainder of the patient's life." The life of a patient so treated is prolonged and rendered more comfortable. A. S. K.

MEDICINE.

Growth on Diets Containing More Than Ninety per cent. of Protein. Osborne, T. B. and Mendel, L. B. **Proc. Soc. Exper. Biol. and Med.,** March 16th, 1921, Vol. 18, P. 167.

The authors have been successful in obtaining growth in rats to three times their weight at the beginning of the trial by feeding on a food mixture containing protein 95 per cent., inorganic salts 5 per cent., along with a supply of vitamines A and B in the form of tablets of alfalfa and dried brewery yeast. The vitamine bearing substances were the only sources of fat and carbohydrate, the protein being supplied in the form of casein. Whether rats will attain adult size and function on such diets is not yet known. If protein alone will act as the sole source of energy and tissue substance new experimental fields in nutrition can be approached. E. H. M.

The Glucose Mobilization Rate in Hyperthyroidism. Sanger, B. J. **Pros. Soc. Exper. Biol. and Med.,** Jan. 19th, 1921, Vol. 18, P. 117.

The study of the carbohydrate utilization in hyperthyroidism was attempted through the respiratory quotient and the blood sugar. Both were determined when fasting and at frequent intervals after the injection of 1.75 grams of glucose per kilo body weight. In all, six normal controls and eight definite cases of hyperthyroidism were studied. A typical blood sugar curve was present in all but one of the hyperthyroid cases. The evidence indicated that carbohydrate is burnt in cases of hyperthyroidism in a perfectly normal manner, but that the liver has a decreased ability to demobilize carbohydrate from the blood stream. This would account for the low glycogen content of the livers of mice and rabbits, thyroid fed, while on high carbohydrate diets, and for the well known tendency of cases of hyperthyroidism to develop acidosis. E. H. M.

Polyarticular Rheumatism Deformans of the Infectious Type and Vaccinotherapy. (Rhumatisme poly-articulaire deformant du type infectieux et vaccinotherapie). De Senarclens. **Revue Med. de la Suisse Rom.** Jan. 1921, No. 1, P. 24.

The writer insists on the correct diagnosis of this condition from other forms of so called dystrophic rheumatism, e.g., gouty rheumatism. Rheumatoid arthritis generally begins under forty-five years, oftenest in women, after a long preliminary period of indefinite pains, often accompanied by muscular atrophy, when the localized joint symptoms appear. There is early ulceration and destruction of the cartilages with the characteristic white, lustrous, "glossy skin", over oedematous subcutaneous tissue. There are frequent remissions, and no fever is experienced.

In other forms of dystrophic rheumatism with bony deformity, the disease appears after the fiftieth year, has no preference for either sex, develops slowly but steadily, with renal sclerosis and myocarditis as terminal factors. The limbs are not oedematous but wasted, and there is no involvement of the cartilages.

After a brief review of the possible aetiological factors, with special reference to suppurative foci, he proceeds to discuss vaccinotherapy. He pays a tribute to the work done in this connection in America and states some of the conclusions drawn amongst others, that this form of treatment is of particular value in articular disorders, when the germ isolated in the primary focus is a streptococcus; and also that in many cases the micro-organism of the local suppuration is found in the urine of the patient. This latter would furnish a means of producing a vaccine, when the primary focus cannot be found. He then gives in detail Dr. Warren Crowe's method of preparing a vaccine from a Staphylococcus albus found in the bladder of several cases and first described in The Lancet in April 1913. He himself reports a case treated by this method with most satisfactory results.

In discussing Crowe's later work (Lancet October 1919) he summarizes the latter's recommendations—that the treatment should be reserved for clear cases, that it is better not to use it in mono-articular forms, and that a proved stock vaccine is better than the autogenous forms. He warns against excessive doses at the start, which should never be above 500,000 units; and states that unlike the method of proteid injections—e.g., milk, to produce a general reaction, this is to be avoided with the vaccine because it is harmful.

Even if the supposed causative agent is not found in the urine, should one employ vaccinotherapy? He concludes in the affirmative for two reasons:—(1) because the organism may be quite virulent in the system without appearing in the urine; (2) because according to Wright's theories of the non-specificity of vaccines, "innoculation produces not only a direct immunization, but also a collateral one." So even if the staphylococcus from which the vaccine is made were found not to be the causative agent of rheumatoid arthritis, this would not prevent the employment of the vaccine. J. L. D.

DERMATOLOGY.

The Role of the Endocrine Glands in the Aetiology and Treatment of Acne. Hollander, Lester. Arch. Derm. and Syph., May 1921.

The view is advanced that acne is largely dependent on disturbed endocrine secretions. Observations have been made of the fact that on the establishment of normal sexual relations acne will disappear. The writer thinks that the frequent incidence of the disease at puberty depends on the upsetting of the balance of metabolism by the demands of the growing organism.

While he holds that the internal secretion of the gonads is chiefly connected with this disease, he has not as yet had any success in treatment with their extract.

Further Indications for Pepsin-Hydrochloric Acid Treatment. Allswede, E. H. Arch. Derm. and Syph., May 1921.

Unna has shown experimentally that a combination of pepsin and hydrochloric acid will penetrate the horny layer of the epidermis and assist in carrying in chemical agents. This fact is taken advantage of in treating keloids large cicatrices and the indurations following acne.

Application is by means of compresses, injections or ointment, using ten parts of pepsin, one part each of HCl and phenol, with water to two hundred parts. The phenol prevents putrefaction. Boric acid may replace the HCl where there is irritation; the action is similar but milder in degree. In ointment form, one hundred parts of petrolatum is used.

The accompanying medication used in keloids, etc., was pyrogallol applied as a varnish under the pepsin-HCl. The collodion of the varnish opens up enough to allow the passage of the digesting substance.

H. E. M.

Picric Acid in the Treatment of Severe Epidermophyton Infection. Weiss, R. S. Arch. Derm. and Syph., April 1921, Part 1.

Numerous cases of epidermophyton infection have been reported in the last two years. In some of these there was much involvement of the toes and interdigital spaces, with considerable disablement.

Picric acid gave excellent results in such cases, applied in watery solution on cotton, and renewed thrice daily. Caution is to be used where the treatment lasts longer than one week. H. E. M.

News Items

NOVA SCOTIA

Dr. T. M. Sieniewicz of Halifax, Nova Scotia, for three and a half years asscoiated with Dr. A. F. Miller in the Tuberculosis Sanatorium at Kentville, has been appointed to the position of Tuberculosis Examiner in the Massachusetts-Halifax Health Commission. Dr. Sieniewicz succeeds Dr. D. A. Craig, the first appointee in this position. All of his time will be given to the public health work of the Commission and to consultation work with physicians of Halifax and Dartmouth.

The monthly report of the Health Centres work just presented to the Massachusetts-Halifax Health Commission by the Chief Nurse, states that 486 nursing, medical and dental consultations were held in the various Health Centre clinics during April; 117 in the Child Welfare and Prenatal Division; 72 in the Ear, Nose and Throat Division; 14 in the special Psychopathic clinic for the disaster injured, and 87 in the Preschool Age Dental service. One hundred and sixty-nine new patients were registered for advice and treatment; forty patients in attendance during previous months were discharged during April.

Eleven classes in First Aid were conducted during April by representatives of the St. John Ambulance Association in the Health Centre at Admiralty House. Three classes in First Aid were held in the teaching room of the Dartmouth Health Centre. Outside talks were also given by nurses associated with the Health Centres during the month. The Chief Nurse delivered an address at the annual meeting of the V.A.D.'s. The work of the Health Centres is growing so rapidly that the staff have difficulty in keeping up with the growth.

A special dental service is being organized by the Executive Officers of the Commission for the summer months. It will be under the advice and general guidance of the Consultant in Dentistry, Dr. Frank Woodbury and Dr. Arabella MacKenzie, a paediodentist at the preschool age dental clinic in Admiralty House Health Centre.

The School Board of Halifax has arranged to have the school nurses during the latter half of May and June make social investigations in the homes of children needing dental work and make engagements for their treatment in the Dental Infirmary. These nurses will give a month of summer holiday to this work. The newly appointed school nurse will begin work at once in order to help speed up this campaign of dental hygiene.

Children having need of operation for the removal of adenoids and tonsils will be given right of way in the dental hygiene clinic. In the beginning only children under ten years of age will be treated. Later in the summer perhaps, the age limit may be raised to twelve years.

The same opportunities will be afforded the school children of Dartmouth, both in the dental hygiene and the nose and throat clinics. These special clinical services will be of great interest to members of the Canadian Medical Association, who meet here in June, and will serve to demonstrate to the profession of Canada that Halifax is thoroughly awake to health needs.

It is doubtful if any vacations will be given the staff until August, when this period of special activity will have ended.

The convocation of Dalhousie University was held on May 5th, when more than one hundred degrees were conferred. Ten members of the class of Public Health Nursing received their diplomas. Fourteen graduates, thirteen men and one woman, were M.D., C.M., and six men received the degree of D.D.S. The Hon. N. W. Rowell, addressed the graduates.

Professor Fraser Harris, of the Chair of Physiology at Dalhousie University, has just been informed that his book on "Nerves" (Home University Library) has been translated into Italian.

BRITISH COLUMBIA

DRUGLESS HEALING AND CHIROPRACTIC

REPORT OF LEGISLATIVE COMMITTEE ON PROPOSED BILLS

Legislative Committee Room,
March 29th, 1921.

Mr. Speaker:

Your Committee appointed to inquire and report in respect to the proposed Drugless Healing Bill, being No. 23, and the proposed Chiropractic Bill, No. 24, beg to submit as their final report the following:—

As on the inquiry into the proposed Optometry Bill, exhaustive evidence was also presented to the Committee for and against these proposed Bills. The Committee had the views, apparently of the most prominent representatives of the drugless healing art and of the best practitioners in Chiropracty, in support of these measures, while the Medical Council, represented by prominent and reputable members of the medical profession, opposed both Bills.

Your Committee have taken great pains to consider with the utmost care the evidence adduced and the representations made, particularly as a great many estimable citizens have apparently received benefit from the chiropractors. Whether these alleged results are more imaginary than real or whether they have yet been sufficiently tested over a long enough period of time, probably remains to be seen.

As in the consideration of the Optometry Bill—so in respect of these two Bills—your Committee had the benefit of the exhaustive report of Mr. Justice Hodgins, referred to in the previous report of this Committee. His report is voluminous and is quite applicable to the principles under consideration.

The general education obtained in Canada through the medical faculties of the Univervsities is, your Committee believe, well abreast of the times. The course has been gradually enlarged to keep pace with expanding medical knowledge, and research institutions in different parts of the world are engaged in enlarging the boundaries of medical knowledge, with an open mind to new discoveries possessing merit. On the other hand, it is difficult, from the evidence submitted, oral and documentary, to ascertain the educational standards or scientific knowledge of those who profess to find in the practice of chiropracty and drugless healing a cure for a great many, if not all, ills.

From the curriculums before us of several American Institutions, and the statements made, it would appear that the standards required and the length of time required for study vary, and on the whole are not long enough to afford sufficient training. It would appear, too, that these schools are without the necessary equipment. It is therefore not possible to say that the medical attainments of those now asking for a change in the law are sufficiently high.

The question to be decided by the Committee is this: Have the chiropractors and the drugless healers made out a case for an alteration of the present law, so that without hindrance they may be permitted to practice the healing art?

One of the leading Chiropractic Colleges in the United States is the "Palmer Institute." Dr. B. J. Palmer, the head of this institution, in giving evidence in the case of the State vs. Jansheski, in December, 1910, when asked whether, when a patient came to a chiropractor, he was asked the history of the case, answered: "No, because it be of no value"; and in answer to why that was so, said:"A person comes to us without telling us what the trouble is; it makes no difference whether a physician has already diagnosed it as insanity, appendicitis, indigestion, or anything they call it. The chiropractor needs to know nothing about that case from a physician's standpoint; it is immaterial, yet he can take that same case, put it down on his benches and analyse that spine just as accurately without knowing those things; in fact, sometimes, I think better. . . . It is not essential the chiropractor should know what the patient said he had, but you can adjust the current for it running into the organ, and the patient is well. That is where chiropractics becomes purely a mechanical proposition, a mechanical and electrical-making circuit proposition in a man."

The definition of this treatment in technical terms was given by McNamara, of the Universal Chiropractic College, Davenport, Iowa, as follows: "The theory sustaining this system presumes that in consequence of displaced vertebra the inter-vertebral foramina (openings) are occluded (closed), through which the spinal nerves pass. . . . In this way the nerves are pinched, and chiropractors assume that such pinching is responsible for 95 per cent. of all diseases. Chiropractic concerns itself with an adjustment of the subluxations, thus removing the pressure on the nerves."

Reducing it to simple language, the chiropractors affect to find traces of practically all diseases in subluxations of the spine, and their treatment is confined to the manipulation of the spine by hand. It is rather a shock to even the superficial knowledge of the layman, to be told that 95 per cent. of all diseases finds a manifestation in the spinal column. The assertion is emphatically disputed by members of the medical profession, and if knowledge, training, and research is necessary to arrive at a conclusion on such a question then certainly the medical fraternity are better able to give an opinion than the followers of these cults.

One of the chiropractors examined claimed to have cured such a wide variety of diseases as chronic colites, kidney stone, dropsy, chronic biliousness, rheumatism, chronic ulcer, ulcerated stomach, tubercular spine, rickets, etc. These diseases, they say, manifest themselves by a displacement of the spine. The spread of disease by germs would appear to be of secondary consideration. In fact, one chiropractor stated that, granted the lung was normal, one could swallow tubercular germs by the million and never take the disease. The same witness, speaking of kidney stone, averred that a man's vertebra must show a subluxation, otherwise he would not have a stone in the kidney.

It would seem apparent that the health and safety of the public is involved in the indiscriminate application of theories such as these to the cure of disease. Public safety is indebted to medical science for the prevention of the spread of contagious diseases; for sanitary regulations and hygienic precautions, the failure to observe which would be disastrous. The standard of knowledge must be maintained at a high point, and there must be some recognized body who, from training and experience are competent to fix these standards. That recognized body hitherto has been the Medical Council, and your Committee can see no reason from the evidence adduced why it should not continue to exercise these functions in the future.

The fundamental requirement in the treatment of disease is ability to make a diagnosis. It is essential to first know what the trouble is before attempting to cure it. That involves a knowledge of and study of certain standard subjects. Your Committee do not believe for a moment, from the evidence, that the only diagnosis necessary is to feel for certain alleged displacements in the spinal column.

We concur with the statement of Mr. Justice Hodgins, whose investigations occupied many months, involving personal examination of these chiropractic institutions, that: "I cannot bring myself to the point of accepting, as part of our legalized medical provision for the sick, a system which denies the need of diagnosis, refers 95 per cent. of disease to one and the same cause, and turns its back resolutely upon all modern medical scientific methods as being founded on nothing, and unworthy even to be discussed.

Your Committee do not doubt that beneficial results have been obtained from the treatment of chiropractors. They have no reason to doubt the word of estimable people who say so. It must be borne in mind, however, that the most of these are chronic cases, and it sometimes happens that by the power of suggestion good results are obtained, particularly in neurotic cases. The Committee were given instances of marvellous cures of shell shock cases during the war as a result of mental suggestion. No doubt new discoveries have been made, and will continue to be made, in medical science; but it is hardly likely that any discovery will enable us to safely dispense with the elementary requirement of diagnosis in the treatment of diseases, and to diagnose it is necessary to have a wider knowledge of the anatomy and of fundamental subjects than simply a certain familiarity with the spinal column.

The chiropractors object to the Drugless Healers Bill, and the latter object to the proposed legislation of the former on the ground that their Bill is all-inclusive. It is sufficient to say, in reference to the Drugless Healing Bill, that the various branches of study pursued by them are simply special courses which are recognized in medical work. This is true of all the branches of treatment referred to in this Bill, except chiropracty. These different types of treatment are carried on by the drugless healers at present really as laymen without sufficient qualifications for the work. They should qualify under the "Medical Act," and then if they so desire specialize in these particular branches.

Notwithstanding the foregoing views, the Committee do not feel that chiropractors or drugless healers should be prevented from practising. We only say that they should first be qualified. They should, before being permitted to practise within the Province, pass an examination satisfactory to the Medical Council, on the following primary subjects: Anatomy, physiology, chemistry, toxicology, pathology, bacteriology, histology, neurology, physical diagnosis, obstetrics, gynecology, minor surgery, hygiene, and the principles and practice of chiropractic. Before taking this examination they should be graduates of a recognized school or college of chiropractic which at least teaches a residence course of three years of six months each year.

The Medical Council in prescribing examinations for applicants for registration as chiropractors should appoint at least one of their number to set the examination in the principles and practice of chiropractic. After passing the examination outlined above they should be registered as a member of the college.

The suggestion that chiropractors would be discriminated against in examinations is not based on fact, as the method of conducting examinations by the Council, by number rather than by name, makes this impossible.

Your Committee therefore recommends that the "Medical Act" be amended to include these provisions. It would be a guarantee to the public that all practitioners were qualified practitioners—a most desirable thing. The chiropractors would prefer to set their own standards and have a Statute providing for a governing body of its own. This would not be safe, or in the public interest. They are doing medical work, curing or attempting to cure disease. It is the accredited representatives of the medical profession—if they are honest and fair, and there has been no suggestion to the contrary—who are best fitted to prescribe the necessary standards.

This report represents the unanimous views of the Committee.

We submit the evidence herewith.

M. A. Macdonald, Chairman.

Obituary

DR. W. H. P. HILL

To the grief of his friends and the great loss of the community Dr. W.H.P. (Harry) Hill died suddenly at the wheel of his car on Saturday, July 23rd. He was born in Edinburgh, Scotland, the son of the late Rev. J. Edgar Hill, D.D., Minister of St. Andrews Church of Scotland in Montreal, and was educated at the Montreal High School and at McGill University, where he graduated in medicine in 1900.

After an interneship in the Montreal General Hospital he took his triple qualification in London, and practised for a time in England, later settling in Montreal where he became attached as Clinical Assistant in Surgery to the Montreal General Hospital, later becoming out-patient surgeon.

He went overseas in 1915 with No. 3 General Hospital (McGill) returning at the end of 1916 with the rank of Major. In 1918 he was invited to the Royal Victoria Hospital as Associate Surgeon and was followed by the esteem and affection of his old colleagues.

As a class friend and associate of the late R. P. Campbell he had many qualities in common with him. Modest of demeanour and quiet of speech he yet inspired his colleagues and patients with the greatest confidence. He combined in an unusual degree soundness of clinical judgement with smoothness and dexterity as an operator, and his bearing toward rich and poor alike had in it the courtliness of another generation.

As Lecturer in Surgery in McGill University he was a clear incisive teacher, whom students looked to with admiration.

He ranked high in that strong body which the Scotch Manse has given to the profession of medicine, and he will be remembered by many, not only as an outstanding surgeon, but as a courteous, kindly Christian gentleman.

Dr. Hill married Miss Isabel Johnston, daughter of the late James Johnston, Esq., of Montreal, who with two sons and two daughters survives him.

DR. MAX O. KLOTZ

In the death of Dr. Max O. Klotz, Ottawa loses a prominent surgeon and the Association one of its active members.

Dr. Klotz was born in Preston, Ont. in 1874, a son of Otto J. Klotz, Director of the Dominion Observatory, and graduated at Toronto in 1895. He has practiced in Ottawa since that date where he acquired an extensive practice and attained many honorary offices in the gift of the profession. For several years he restricted his work to surgery. He was surgeon of the Protestant Hospital, and at the time of his death was President of the Ottawa Medico-Chirurgical Society. He represented his district in the Ontario Medical Council for several years, and was President of the Council in 1913.

Dr. Oscar Klotz, formerly of McGill University, now of the Rockefeller Institute, is a brother.

DR. CHARLES E. GRAHAM

Dr. Charles E. Graham one of the oldest physicians of the Ottawa Valley died at his residence, Hull, Que., on January 13th, aged 76 years.

Dr. Graham graduated at McGill in 1866 and begun the practice of his profession in Hull the following year. He retired from active work several years ago, owing to failing health. Notwithstanding an active practice he found time to fill various public offices on the board of health, the city council, and filled with distinction the Mayor's chair. He was Justice of the Peace and Coroner for his district.

He married a granddaughter of Philimon Wright, the founder of Hull. He is survived by two sons, G.D. and C.K. Graham and one daughter, Mrs. (Dr.) Mayburry, of Ottawa.

DR. WALLACE CALVIN ABBOTT

Dr. Wallace Calvin Abbott died at his home in Chicago on July 4th. He graduated from the University of Michigan as Doctor of Medicine in 1885, and in the following year engaged in the practice of medicine in Chicago, building up a large practice on the North Side and winning many friends.

During this time Doctor Abbott established The Abbott Alkaloidal Company, now known as The Abbott Laboratories, of which firm he was President continuously from the time of its establishment, more than thirty years ago, until his death.

Book Reviews

THE ROENTGEN DIAGNOSIS OF DISEASES OF THE ALIMENTARY CANAL. By R. D. CARMAN, Mayo Clinic.

This is the second edition of this work, the first having appeared early in 1917. Two new chapters have been added, one on Hour-glass Stomach, and one giving a chronologic abstract of the published work on Pneumoperitoneum.

As in the first edition, the text is excellent. The matter is presented in a very clear style, and each chapter is profusely illustrated with reproductions.

One of the features which adds greatly to the work, is the Bibliography which is added at the end of each chapter, and provides the reader with a very complete list of published papers on the particular subject dealt with.

The attention of the general reader, and of every internist and teacher, should be directed to the chapter on the normal stomach, in which it is fully demonstrated that the "Normal" stomach is purely relative, and must be considered in the light of many factors, the chief of which are: Bodily type or habitus; the abdominal wall; gastric tonus, etc.

Of these one may be quoted "the chief test by which the stomach is to be adjudged of normal tone is its *correspondence to the habitus of the individual*, and not its form, size and position alone."

Photographs of persons conforming to the different types of bodily habitus are shown with tracings of the stomach in the erect posture and Rœntgenograms of normal stomachs in each of the several types, as well as of the commoner variations in tone in the gastric musculature proper. This chapter should go far towards correcting the older teaching as to what constitutes a "Normal" stomach.

Following this, the many variations which occur in the form, tone, position, size, mobility, peristalsis and motility are fully dealt with, and in connection with the latter a comparison is made of the results obtained by the Rœntgen-ray and other clinical methods.

An entire chapter is devoted to spasm. Since spasm is the "bete noir" of most Rœntgenologists, and the cause of much of the indefiniteness of gastric symptomatology, this chapter is very much to the point and will repay the clinician quite as fully as the Rœntgenologists for its careful perusal.

The diagnosis of Gastric Cancer is very fully dealt with, and many cases are quoted with their histories. The points of differentiation between true and false filling defects, and between cancer and other tumours, both intrinsic and extrinsic, are very completely indicated.

Three forms of cancer are recognized:

1. Proliferative or fungous type.
2. Infiltrative or scirrhous.
3. Degenerative, colloid or mucoid.

While the importance of the early recognition of cancer is admitted as offering the greatest chance of operative cure, "It is also highly important that the patient shall not be subjected to needless surgery, and where the Rœntgen findings, plus the clinical features of the case do not quite justify surgical exploration, the patient should be re-examined at short intervals, until a decision is reached."

Too often the Rœntgenologist finds himself called upon by the surgeon or physician to commit himself to a positive opinion upon a single examination, when the data is insufficient to justify any such request.

Leather bottle stomach, syphilis, and various other benign tumour-producing lesions of the stomach are discussed with reports and case histories, while the chapter on ulcer is very full. Four types are described:

1. Small, mucous-membrane erosions.
2. Penetrating or perforating with deep craters.
3. Perforated.
4. Carcinomatous ulcers.

There seems still to be some uncertainty among many members of the profession as to the accuracy of the X-ray method in recognition of gastric ulcer, and one wishes the author had made a more authoritative statement upon this point. He says very modestly "At the present stage, the accuracy of the Rœntgen diagnosis of gastric ulcer is greater than is generally appreciated, and considerably exceeds that of customary clinical methods." This we believe is an unnecessarily conservative view to take in view of the known high percentages in his own and other's work.

The controversy as to the degeneration of an ulcer into carcinoma is touched upon lightly in one paragraph. The chief evidence of a suspicious character he considers extreme size of the crater, "An ulcer with a niche 3 c. m. or more in diameter is likely to prove cancerous." The importance of an exact diagnosis is urged.

The new chapter on Hour-glass Stomach is an admirable presentation of the doctrine which Rœntgenologists have been teaching for several years past, and which is well summarized by the author in one sentence. "Hour-glass Stomach should not be considered a disease entity, but an end-result of various pathologic processes, gastric and perigastric."

Many of the rarer forms of gastric disease are illustrated, and a short chapter on the stomach in infants and children summarizes most of the essential information as we have it at present.

The author goes in some detail into the "Stomach after operation," and gives his observations upon thirty cases of regurgitant vomiting following gastro-enterostomy, all of which were reopened.

In the Rœntgen diagnosis of Gall-stones the author has adopted a conservative attitude and places the percentage of accuracy of his own work at 50 per cent., where the essential disease is cholecystitis He believes that every effort should be made to perfect the method, and advises the Rœntgenologist to use it constantly, "even though his failures far outnumber his successes."

Duodenal ulcer is recognized by means of:

1. Direct signs.
2. Indirect signs.

The author appears to attach rather more importance to the second group than the majority of present-day Rœntgenologists, while giving first place to the demonstration of a definite deformity of the cap.

The articles on the small intestine and appendix and colon are full, and the claim made for the X-ray method conservative. The book closes with an account of the newer work which is being done on Pneumoperitoneum, with a complete Bibliography of the published work on this subject.

G. E. R.

Diagnostic and Therapeutic Technic. A Manual of Practical Procedures Employed in Diagnosis and Treatment. By Albert S. Morrow, M.D., Late Lieut.-Colonel, M.C., U.S.A., Attending Surgeon to the City Hospital, and to St. Bartholomew's Hospital, New York City; Consulting Surgeon to the Nassau Hospital, Mineola, L.I. Third Edition, Entirely Reset, Octavo of 894 pages, with 892 illustrations, mostly original. Philadelphia and London, 1921. Cloth, $8.75, net. W. B. Saunders Company. Toronto: The J. F. Hartz Co., Ltd.

The changes and additions which appear in this new edition bring it well up to date and make it a safe and valuable guide for the general practitioner and hospital interne in carrying out the procedures here detailed.

General diagnostic and therapeutic methods are first described followed by those applicable to special organs and regions of the body. The work is profusely illustrated by excellent line drawings, making the technique of various procedures quite clear. To make each section complete in itself there has been much repetition, and it is questionable whether this is desirable because of the added bulk—for example, plates 76 to 83 reappear later as plates 308 to 314, the head mirror appears six times under ear conditions, six times in the nose section, three times in the larynx section, as well as in other sections. Numerous other plates are also repeated. The section on Pneumothorax is not quite up to date, but the author is to be congratulated on his volume as now revised, reset and reprinted. It contains in one volume so much that is usually to be found only by consulting many works on medicine, surgery and laboratory procedures, that it forms a valuable ready reference volume for the practitioner. J. H. E.

Keen's Surgery, Volume VII. By Surgical Experts. Edited by W. W. Keen, M.D., LL.D., Hon. F.R.C.S. England and Edinboro, Emeritus Professor of the Principles of Surgery, Jefferson Medical College, Philadelphia. Octavo of 855 pages, with 359 illustrations, 17 of them in colours. W. B. Saunders Co., 1921, Philadelphia and London. Price with Volume VIII to be issued, and Revised Index, $25.00 Sole Canadian Agents, The J. F. Hartz Co., Ltd., Toronto.

This volume may be briefly but accurately described as a compilation of the progress of surgical knowledge and achievement during the period of the great war. Much of this progress has been the direct result of the unique opportunities for clinical observation, and the consequent war, but this book is by no means to be considered as a Military Surgery. On the contrary, the endeavour of the authors is "to make available for the surgery of peace the lessons taught us during the war."

Chapters I to VII deal with Inflammation, Diseases caused by Animals, Insects and Reptiles, Anthax, the Surgery of the Skin, Syphilis, Gas Gangrene and Tetanus. While each is excellent, special mention must be made of the magnificent illustrations in the chapter on Gas Gangrene, and to readers of The Journal unusual interest will attach to the article on Inflammation, by our old friend, John George Adami.

Chapters VIII to XII may be said to deal more particularly with Military Surgery, covering, as they do, The Organization and Administration of the Medical Departments of the Army and Navy in War, Surgery in a Fighting Ship, Traumatic Shock, and Traumatic Hysteria, including so-called "Shell-Shock." The concluding sentence of Chapter XII is of great interest, illustratas it does the real nature of this condition, "Of 2,300 American soldiers suffering from shell-shock more than 2,000 were cured by the news of the signing of the armistice."

Chapter XIII, on The Transfusion of Blood, is of great interest, and the one sentence, "When it is realized that in the British, French and American armies the method ultimately adopted was some form of citrate transfusion, it is evident that this means of blood transfer appealed to all as the simplest and most practicable for war purposes," illustrates a great lesson for civilian practitioners.

Chapters XIV, on The Bacteriology of War Wounds, and XV, on Surgical Technic with special reference to the Treatment of Infected Wounds, each contain much information of value, and cover the ground thoroughly.

Chapters XVI, on Fractures, and XVII, on Gunshot Fractures, deal fully with this subject, and describe the newer methods of treatment evolved during the war.

Wounds of the Nervous System, Injuries of the Spine and Spinal Cord, and Injuries of the Peripheral Nerves are fully discussed in Chapters XVIII, XIX and XX.

The experience gained and lessons learned during the war as to the Military Surgery of Joints is well discussed in Chapter XXI, and the advances made in Orthopedic Surgery in Civil Life are fully covered in Chapter XXII. One is pleased to note the references to Dr. Gallie's work, but it is unfortunate that through a typographical error his name should have been misspelled in the Bibliography.

The following chapter on Military Orthopedic Surgery, by Sir Robert Jones and E. W. Hey Groves, is a masterpiece such as one would expect from the distinguished authors, and the lessons taught should be of incalculable value in civilian practice.

The concluding chapter on the Surgery of the Vascular System is also a contribution of great merit.

Altogether it may justly be said that the high reputation of Keen's Surgery as a standard work on the subject will be further enhanced by this additional volume, the information contained in which is authorative and in keeping with the last word in modern methods. E. R. S.

A Manual of Surgery. For Students and Physicians. By Francis T. Stewart, M.D., formerly Professor of Clinical Surgery, Jefferson Medical College; Surgeon to the Pennsylvania Hospital. Fifth Edition, 1086 Pages and

590 illustrations. Published: P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia. Price, $10.00. net.

To cover the whole field of Surgery, both nonoperative and operative, including the surgical affections of the female pelvis, and excluding only the diseases of the eye, in a single octavo volume of approximately one thousand pages, is an undertaking of considerable magnitude.

That it has become necessary to issue a fifth edition of this volume illustrates how well the author has carried out his intentions as stated in the preface to the first edition, viz.: "The following pages have been prepared for the undergraduate whose crowded hours demand a manual stripped of verbiage and unessentials."

The work has been fully revised, and includes references to the most advanced ideas along many lines. It may be described as a complete compact, safe and authoritative presentation of the subject, which should be an excellent guide to the student, either before or after graduation.

The description of those operative methods, which the author has been instrumental in developing, and which are sometimes referred to by his name, *e.g.*, Amputation of the Breast, Gastro-Enterostomy, Subtotal Gastrectomy and the Radical Cure of Hernia, is particularly good, but due reference to and consideration of other methods is by no means neglected.

Where so much information is compressed into so compact a form it is obvious that the reference to many important matters must be very brief, but it would appear that more importance should be attached to the value of the Wassermann test in the diagnosis of syphilis, than is here accorded.

E. R. S.

International Clinics. Thirty-first series, Vol. I. Edited by by H. R. M. Landis, M.D., Philadelphia, U.S.A., with Medical and Surgical Collaborators in United States, England and Canada. 1921: J. B. Lippincott Company, Montreal, Que. Price, $2.50 per volume, or $10.00 for the series of four.

This quarterly of illustrated clinical lectures and original articles is well up to the standard set by previous volumes.

In addition to splendid articles in the departments of obstetrics, medicine, surgery, pediatrics and industrial medicine, there are two carefully prepared reviews of the literature of 1920, that on medicine being done by Frank A. Craig, and that on surgery by John Speese. These occupy about one-third of the volume and make it a valuable work for the practitioner who wishes a careful view of the progress of medical and surgical science during the past year.

J. H. E.

Principles of Biochemistry. For Students of Medicine, Agriculture and Related Sciences. By T. Brailsford Robertson, PhD., D.Sc., Professor of Physiology in the University of Adelaide, South Australia. 633 pages. Price, $8.00. Publishers: Lea and Febiger, Philadelphia and New York, 1920.

This volume is a praiseworthy attempt to accomplish a very difficult task, and the author has very measurably succeeded in achieving his object. The greater part of our knowledge of the processes, physical and chemical, of living matter and of its products, is of recent origin, for biochemistry as an independent science may be said not to have begun to win its place more than twenty-five years ago and, in consequence, there is as yet not the perspective that time alone can give, necessary to standardize adequately many of the more important results of biochemical researches which are of recent origin. It will take time, perhaps as much as ten years yet, to properly appraise and correlate many of the observations made in recent years and, therefore, the question may arise whether the emphasis that the author has given to certain subjects may be ultimately justified. This is more especially possible in consideration of the importance given by the author to the results ascertained in connection with the fertilization and early development of the ovum (pp. 446-470), which must be contrasted with the more or less scanty attention accorded to the subjects of anaphylaxis and immunity.

There are some noteworthy omissions of topics which are of importance to students of medicine, an example of which is amyloid (lardacein) of the pathologist to which there is in the text not a single reference.

The volume will, nevertheless, be of great assistance to the class of students for which it was designed and doubtless the author, who is a young biochemist of very considerable achievement as a researcher, will succeed in future editions in making it an exceedingly valuable standard text-book.

A. B. MacA.

RATIONAL TREATMENT OF PULMONARY TUBERCULOSIS. By CHARLES SABOURIN, M.D., Medical Director of the Durtol Sanatorium, Puy-de-Dome, France. Authorized English Translation from the Sixth French Edition, 440 pages. Philadelphia: F. A. Davis Company, 1921. Price, $3.50, net.

HERE is a book without introduction or preface. The author has no apology for writing it nor the translator for translating it into English. It is a book with opinions based upon what appears to have been rather extensive opportunities for observation. It combines happily much practice with its theories. Many of the deductions are trite, some are expanded. The view point seems different from ours in Canada and yet the basis is the same. It is full of good common sense, very readable, and is attractive. It is a systematic treatise on treatment without appearing to be such. We welcome this book and feel it will appeal to English readers. J. H. E.

THE WASSERMANN TEST. By CHAS. F. CRAIG, M.D., M.A., F.A.C.S., Lieut.-Colonel Medical Corps, United States Army; Professor of Bacteriology, Parasitology and Preventive Medicine, and Director of Laboratories, Army Medical School, Washington, D.C. Second Edition, 279 pages, three coloured plates, ten illustrations and sixty-one tables. Published by the C. V. Mosby Co., St. Louis, U.S.A. Price, $4.25.

IN this volume the author has produced a most excellent and thorough presentation of the Wassermann Test, considered from every angle. He refers to the discovery of the test, the nature of the reaction, and the factors which influence the result. His description of the preparation of the reagents used, while highly technical, is extremely exact, and must be of much value to the practical serologist.

The reasons he advances for his own modification of the original test are convincing, and it would appear that special importance should attach to the use of the antihuman hæmolytic system with a suspension of human corpuscles obtained from an individual belonging to Group IV of the Moss classification as a hæmolytic antigen, rather than a suspension of sheep corpuscles.

His chapters on the Interpretation of the Result of the Test, the Effect of Treatment on the Test, the Use of the Test as a Control of Treatment, and the Value of the Provocative Reaction are most illuminating, and will convey much information of value to every student of syphilis.

The final chapter on the Wassermann Reaction on the Cerebro-Spinal Fluid is excellent, and includes practical directions for carrying out the Colloidal Gold, the Globulin and the Cell-Count Tests, with interpretations of the results.

The author should be congratulated on his work, and the book should be widely read, alike by the general practitioner, the specialist in venereal diseases, and the laboratory serologist.

E. R. S.

PRACTICAL PSYCHOLOGY AND PSYCHIATRY. By C. H. Burr, M.D. F. A. Davis Company, Fifth Edition.

The new edition of this Manual shows that it has been carefully rewritten and that a modern classification of mental diseases has been followed.

The book is eminently suited for use in teaching Insanity to junior students and for the use of training schools for nurses. A careful description of the physiological activities of the brain is followed by a full but not too deep account of the various mental changes that occur in abnormal states. The writer follows with an interesting account of Symbolism in Sanity and in Insanity, which is clearly a particular hobby of his own.

Part three deals with all the common types of Insanity, but not to the extent required by the specialist.

The final sections of the work are concerned with treatment, nursing, and finally, with a very valuable chapter on a subject usually neglected, namely, the prevention of Insanity.

The comparison of the life and the education of the boy of the last century, with the exhausting and unnatural life of today, is alone worth the price of the book. G. W. H.

PSYCHOLOGY AND PSYCHOTHERAPY. By WILLIAM BROWN, M.A., M.D. (Oxon), D.S.C. (London). London: Edward Arnold. Price, 8s. 6d.

This book is scientific and at the same time interesting from the numerous interesting clinical cases that are to be found throughout the volume, and which were collected during the author's war service.

As a well co-ordinated collection of the work of different writers on the mechanism of normal and abnormal psychology, it is most excellently penned and is particularly useful to those who desire to obtain acquaintance with the views of such writers as Freud, Prince, Janet, Ribot, McDougall, Myers and Burgson, in a short time and with little study.

Disassociation of the Ego is well treated, with full discussion of the views of other writers in the opening chapters, which are followed by an able description of Freud's Theory of Dreams and of his views likewise on the Unconscious, while a fuller comparison of the theories of writers on Emotion is discussed to present Freud's views in a true perspective.

An excellent chapter on Psychotherapy is followed by a series of cases to exhibit its application in the world war.

The present spiritualistic outbreak in England is probably the reason of author's devoting the final chapters of his book to the Relation of Mind to Brain, which is thoroughly discussed.

Altogether one must congratulate the writer on the production of a most interesting and well arranged addition to the literature on mental problems. G. W. H.

FUNCTIONAL NERVE DISEASE. Edited by H. CRICHTON MILLER, M.A., M.D. Late consulting Neurologist, 4th London General Hospital. 208 pages. Price, $3.00. London: Oxford Medical Publications; Toronto: McAinsh & Co., Limited.

The plan followed in this volume was for a group of the younger physicians to each take up a separate subject bearing on the Functional Neuroses, and to discuss it, and then to arrange these papers in proper sequence.

Three articles on the physical side of the Neuroses are followed by four on Hysteria, by two on the Anxiety Psychoses and finally by three on treatment.

The basis of the book is along the Freudian lines, and the theories of Repression and Regression are discussed from the viewpoint of several groundpoints.

There is a very careful synopsis to each chapter, but this is a mistake, as it is very lengthy, and does not help the reader in any way.

The articles on treatment by suggestion and hypnotism are really valuable as giving the actual result of men who have used them very freely. G. H.

SYPHILIS AND ITS TREATMENT. With Especial Reference to Syphilis of the Skin. By WILFRED S. FOX, M.A., M.D. H. K. Lewis & Co., Ltd., London. Price, 36s.. net.

This volume of 195 pages covers the subject in a very understandable and easily read way, particular attention being given to the dermatological aspects of the disease. Many paintings of clinical cases are inserted, as well as many semidiagramatic cuts to illustrate clinical cases. The author does not seem to lay enough stress on the value of the dark field examination for the spirochæte, but describes more minutely the various stains used in demonstrating this organism. A description of the various forms of treatment is useful and is very sane and conservative.

Dr. Fox, while discussing the various public health aspects of the problem, favours the method of prevention by treatment of existing cases and by the free use of prophylactic ointment. He does not entertain the hope that the nation will suddenly improve morally. D. K. S.

The Anatomy of the Nervous System. The Anatomy of the Nervous System, from the standpoint of development and function. By Stephen W. Ranson, M.D., Ph. D., Professor of Anatomy in Northwestern University Medical School, Chicago. Octavo volume of 35 pages with 260 illustrations, some of them in colors. Philadelphia and London: W. B. Saunders Company, 1920. The J. F. Hartz Co., Limited, Toronto, Ont. Cloth, $7.25 net.

This is a most excellent anatomy of the Nervous System and will repay reading from the beginning to the end. It reminds one of Barker's original work on The Nervous System, but of course, is much more modern in its details.

It is especially valuable in its arrangement as it takes the reader gradually on from point to point and carefully describes each part of the Spinal Cord and Brain in natural sequence. The description is extremely clear, and the plates are excellent. The volume is suited for the anatomist and should also be in the library of every student of Neurology as a reference volume.

G. W. H.

The American Year Book of Anesthesia and Analgesia. Vol. II. 1917-1918. F. H. McMechan, A.M., M.D., Editor, pp. 483 and index. Numerous illustrations. New York, Surgery Publishing Company, 1920.

The exigencies and demands of the war are the editor's reasons for the late appearance of this volume of the year book. In both the science and practice of anesthesia and analgesia there are many controversial points which require careful investigation and study. In the year book a number of fundamental studies find their place and some of these are of exceptional merit. The advances made in these subjects in the surgery of war form some of the notable contributions, while the editor has been convinced that the handling of anesthesia and analgesia by the various allied Medical Services was not what it should have been. The army anesthetic methods which underwent considerable development and advances are now finding their application in civilian practice, and tne articles in the year book should find a wide circle of readers, for the practice of anesthesia is rapidly becoming a specialty in the practice of medicine.

Local, spinal and sacral anesthesia receive due attention. Your reviewer feels he cannot in fairness select any of the essays and contributions for special mention where the standard of excellence is so high, but extends his congratulations to the editor and expresses the hope that the year book will meet with the success it deserves and secure the support necessary for its continuance. There is a full Bibliography of the pertinent literature and we find acknowledgment made to McGill Hospital Unit, Toronto General Hospital and this Journal for courtesies extended.

J. H. E.

Epidemic Respiratory Disease. The Pneumonias and other infections of the Respiratory Tract accompanying Influenza and Measles. By Eugene L. Opie, M.D., Colonel M.R.C., U.S. Army; Professor of Pathology, Washington University School of Medicine. Francis G. Blake, M.D., Major, M.R.C., U.S. Army; Associate Member of the Rockefeller Institute for Medical Research. James C. Small, M.D., formerly first lieutenant M.C., U.S. Army; Bacteriologist, Philadelphia General Hospital. Thomas M. Rivers, M.D., formerly first lieutenant M.C., U.S. Army; Associate in Bacteriology, Johns Hopkins University. pp. 402, 33 illustrations. Price $6.50. C. V. Mosby Company, St. Louis, 1921.

This is a report of a commission appointed in July 1918, by the Surgeon General U.S. Army, to study the pneumonias prevalent in the army. Their observations were made at Camp Funston, Kansas, and Camp Pike. Their work covers the epidemic pneumonias of the summer of 1918, those associated with the severe epidemic of measles, and those complicating the influenza epidemic of the autumn of 1918. Some 979 cases of measles were studied, but as these cases occurred at the time of the influenza epidemic, the picture is modified by the presence of the latter. These two camps with their 50,000 men and high mortality, afforded an enormous amount of bacteriological and pathological material.

The authors conclude that the influenza epidemic of 1918 differed in no essential feature from that of previous epidemics and particularly the pandemic of 1889-90, and that the B. influenzae of Pfeiffer was constantly present. Noteworthy is the severity of the attack upon the bronchial passages; purulent bronchitis was present in 36 per cent. of the influenza cases and in all these the B. influenzae was found, always associated with some other organism, pneumococcus, S. haemolyticus, S. Viridans, M. catarrhalis, etc. In the pneumonias B. influenzae was present in 80 per cent. and the authors believe is to have been constantly present though not always isolated. Microscopic study of the bronchial walls demonstrated the marked destruction brought about by influenza leaving the tissues open to secondary invaders. In civil life, types I and II of the pneumococci are the causative organisms in two thirds of all cases, while in the influenza epidemic the lobar pneumonias showed an entirely different incidence, type IV 32.4 per cent., type II a typical 26.5, type III 17.6, type II 5.9, type I, 2.9, and no pneumococci in 14.7 per cent.

Streptococcus pneumonia, staphylococcus

pneumonia, the bronchopneumonias, pulmonary abscess, empyema ,and the bronchiectasis so frequently found as a sequela of the severe bronchitis of influenza, are all fully discussed. The various organisms and their relation to the varied clinical and pathological findings are described with a wealth of detail which make the study a most valuable contribution to our knowledge of the respiratory complications of influenza.

The question of cross infection in the wards of a hospital receives attention and cases are given illustrating the recovery of a patient from a pneumonia due to one type of pneumococcus, only to develop another severe or fatal infection from a patient in an adjoining bed who had a pneumonia due to another type of organism.

There is a valuable summary of investigations and conclusions which contains much that should be of value to army and civilian hospitals in the presence of another epidemic of acute respiratory disease.

The illustrations are splendid, and the press work of the best. We congratulate the authors upon their excellent presentation of their material and the conclusions therefrom. Their work must have been done under great stress and strain as was all work in those hospitals caring for influenza when the epidemic was at its height.

The book deserves to be widely read.

J. H. E.

On Diseases of the Lungs and Pleurae, including Tuberculosis and Mediastinal Growths. 6th Edition. By Sir R. Douglas Powell, Bt., K.C.V.O., M.D., and P. Horton-Smith Hartley, C.V.O., M.D. Pages XX-798, 36 plates and other illustrations. H. K. Lewis & Co. Ltd., 28 Gower Place, London, W.C.I. 1921.

It is twenty eight years since Sir Douglas Powell brought out this volume originally, and now nine years after the fifth edition, we have the sixth edition in which Sir Douglas has had the collaboration and assistance of Dr. P. Horton-Smith Hartley. Some of the articles have been somewhat condensed, while new chapters have been added on Gunshot Wounds of the Chest, Chylothorax, Massive Collapse of the Lung, Sporotrichosis, and Artificial Pneumothorax. The chapter on "some essential points in the Anatomy and Physiology of the Lung" is well written and forms a splendid introduction to the text dealing with disease, as do the succeeding chapters on physical examination. In these latter the mechanism of the production of the various physical signs elicited in health and disease are discussed, and this is most helpful to the earnest student and discerning physician.

In the chapter on Asthma the recent work of Freeman and Walker on the part played by proteins in the causation of Asthma recieves due mention. There is but one little reference, however, to the technique of testing out protein sensitization.

Approximately two fifths of the volume is taken up with the subject of pulmonary tuberculosis, much of which has been revised.

The book is a splendid summary of the best British thought in the etiology, diagnosis and treatment of pleural and pulmonary diseases, both acute and chronic, and is particularly pleasing in its insistence upon, and repeated demonstrations of, the great clinical value of careful history taking and physical examination as the basis of all diagnosis. Like the related works of Samuel West and the classic of Fowler and Godlee, this book in its former editions has made a place for itself in British practice.

Though not detracting from the real value of the book, there are numerous scattered evidences of careless proofreading which we do not care to see in such a splendid work, and we would suggest that plates such as figures 6 and 7 (from Quain) and 8 and 9 (modified from Merkel and Thane) would be improved if they indicated the range of movement of the lower border of the lungs, instead of depicting them as in fixed relation to certain ribs.

Our one great disappointment is to find so little value placed upon careful X-ray study of the thoracic diseases and particularly the way in which the stereo-roentgenogram is passed over in almost complete silence. In Canada and the United States we have learned to look upon this field of study as adding greatly to our means not only of diagnosis, but of ascertaining the extent and location of various lesions within the chest. We trust

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this will receive the space it deserves in a future edition.

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J. H. E.

Practical Tuberculosis, a book for the general practitioner and those interested in tuberculosis. By Herbert F. Gammons, M.D., Superintendent Woodlawn Sanatorium, Dallas, Texas. Introduction by J. B. McKnight, M.D., Superintendent and Medical Director, Texas State Tuberculosis Sanatorium. Pp. 158, 11 illustrations. St. Louis, C. V. Mosby Company, 1921. Price $2.00.

This small book is probably well conceived, but so badly executed as to warrant its withdrawal by the publishers. Murdered English, misleading half truths, and careless statements abound throughout it, and quite spoil a book which contains much of merit. Some sentences which could be multiplied beyond the space available to the reviewer, are here presented "he (the examiner) must be able to hear and have a stethoscope that is comfortable to the ears and auditory canal". "It is very evident that a physician would have a very poor practice, who did not have at least twenty tuberculosis patients under his supervision each year". "In nearly all adults one will find fine crackles in the lower axillary region on deep inspiration; naturally one should be suspicious of tuberculosis in these cases". "The diseased voice transmission is very variable". "Exaggerated resonance is usually an indication of emphysema". "Neuritis is a frequent complication of tuberculosis even in the early stages, and we must consider the possibility of all neuritis attacks as resulting from tuberculous infection". "Blow-ups in tuberculosis are considered due to **extension of the bacilli** through the lymphatics". "Inspiration is voluntary, while expiration is due to the elasticity of the lung tissue and also to the contraction of the chest muscles and diaphragm". "In the healthy adult male about 20 c.c. of air are introduced into the lungs and bronchial tubes during each inspiration". "Coughing usually results from an irritation in the laryngeal passages". "Tuberculosis patients often lower their temperature by exercise". Vaccination has often lit up tuberculous infections". "Do not forget that Nature has cured many tuberculous persons, and that medicines, vaccines and serums have killed more patients than they have cured". "Resorting to the use of opiates should be delayed as long as possible, **because frequently opiates prolong the life** of these hopeless incurable cases, who have an impaired mind which causes them and their associates much discomfort".

He states that artificial pneumothorax should be given by a specialist, yet goes on to describe the operation in such a manner that if an attempt were made according to his directions, disaster would almost surely follow.

After making a good statement of the value and limitations of the x-ray in diagnosis and pointing out that only good plates are of value, he uses for illustration some four plates whose lack of detail make them as valueless as those he decries.

The names of men prominent in the history of medicine and tuberculosis are frequently mis-spelled and the legends under the illustrations show great carelessness in writing and typography.

There is no excuse for the appearance of a book full of such glaring defects and mistakes.

J. H. E.

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PRESIDENTIAL ADDRESS

Ladies and Gentlemen,—

My first duty is to thank you for the honor of presiding at this, the fifty-second meeting of the Canadian Medical Association. I am not vain enough to even hope to add lustre to the chair—a chair illumined by so many of the brightest and best of the sons of Canada. I shall be content if I allow it not to suffer any eclipse during my incumbency.

Upon a president rests many burdens, but our efficient committee of arrangements has relieved me of most of them. There is one they could not shoulder, and that is the presidential address. For better or worse, the members of that committee stood aloof from what they considered to be sacred ground. So here I stand before you untrammelled and burdened with the annual message.

Among the many subjects that appealed to me for my address was medical education in the Maritime Provinces, but I dismissed it as being too sectional. Besides, I am no historian, and I would not risk the reputation of our graduates, scattered from Corea to Cape Sable, by a lame effort of mine to describe the history of their Alma Mater, the Halifax Medical College.

I, therefore, decided to choose a subject of more universal interest and application—somewhat like the sermon of one of Wesley's lay preachers of which he was very fond. It was based upon a text from St. James; "the tongue is an unruly member," and he always began his sermon: "Brethren, the subject of my discourse to-day is in everyone's mouth."

Universality of application will not be found wanting in my choice of subjects, viz., "Professional Tangents."

The subject naturally falls into two divisions: (a) Our relations or contacts with each other, and (b) our relations or contacts with the outside. The old woman was not very far wrong when she divided humanity into three classes—men, women and doctors—so we have relations to each of these, but specially to one another.

Before taking up these relations in detail, I may be pardoned, in view of what I have hereafter to say about medical education, to take a passing glance at the Halifax Medical College. To that institution I gave the best part of thirty years. Its governors, senate and teachers were all medical men. We developed an enthusiasm and solidarity which is rare to find in more cosmopolitan institutions. We gave first place to anatomy, the institutes of medicine or physiology and clinical instruction; second or third place only to handmaids. The amphitheatre and lecture room were used. but not emphasized. Give me a student well drilled in anatomy, with an intelligent knowledge of physiology; whose powers of observation and analysis have been well trained at the bedside, and I will wager upon his ability to hold his own against all comers.

But the Carnegie philanthropists came along to spy out the land. They saw the buildings; that was enough, for we had no sky-scrapers. They asked not to see the men. nor to find out their methods of teaching. They gave an evil

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report, and to the credit of the profession in Halifax; its teachers in the Halifax Medical College disbanded, in order to give medical education in the Maritime Provinces the benefit of the tutelage, oversight and imprimatur of an endowed university. Nor can we in Canada be over-grateful for the victory of kinship over nationalism, which made such liberal endowments possible.

We owe much to our neighbors, but I must hurry on or my prologue will be like the postscript of the Irishman's letter, twice the length of his communication. So I take up our mutual contacts. These may be summed up in two words: gentlemanly conduct. But here we will do well to take a lesson from the Book. The whole moral law can be summed up in one word, love; but when the angel of Jehovah took Israel under his tutelage, he elaborated that word into ten specific and all-comprehensive Commandments.

So with the words gentlemanly conduct. They are not enough. We want something more definite. Dr. Percival of England over a century ago felt they were not enough when his son left home to practice his profession. With noble solicitude, he wrote a letter, or a series of letters, to guide him in his relations to his brethren, his patients and the public. They were published in England in 1803. They were adopted with very few minor alterations as the American code of Ethics in 1847 and by this association, some years afterwards. Is that enough? If so, let me ask all who have seen this code to hold up their hands.

I asked this at a medical meeting not long ago, and not half a dozen responded. There is something wrong—something wanted. Again to the Book. They were commanded to write His law in prominent places. What prominence have we given to our Code of Ethics? I hold in my hand the Code of Ethics of the Canadian Medical Association. You see how small it is—paper-covered, too, like so much advertising stuff that comes to load our desks. Good kindling—that is all, and that was the fate of one copy sent to me by our general secretary on request. Before then I never saw one, never knew, in fact, that we had one.

I would suggest, therefore, that this association take steps to get out a copy like this American quarto, which is respectably bound with Dr. Flint's commentaries. I would go one better. I would make it an octavo, no matter how thin, and I would have a copy given to graduates when they register in any and all of our Provinces. I also suggest that in order to make the Code duly prominent, every graduate, when registering, should be made to ascribe dominance to our Code, by subscribing his or her name in promise of obedience thereto.

So much for our relations to one another. Our individual contracts. There is another close by: our relation to those who come after us, and, therefore, to medical education. Some one says leave that to the Universities. But our laws do not leave it to the Universities. They saddle us with that responsibility, because Universities are governed by men who cannot see things medically. Through our Provincial Boards we have to prescribe the course of instruction and sit as assessors or associate examiners at University examinations. These two duties imply a third: that of keeping track of the methods adopted by Universities to fulfil our requirements. I am, therefore, strictly correct in bringing this phase of our objective under review.

As examiner for Dalhousie, I led a graduate of one of our best Universities to the bedside of a patient with a typical Hunterian sore. What do you see? "A sore." Very well, what kind of a sore? "A hard sore." What kind of a hard sore? He was stuck. Trying to help him out! Did you ever see a desquamating papule? "No." Ever see Richords parchment? "Never." A Hunterian chancre? "Never heard of it." That is strange, I remarked, unless you come from a college where all the people are good. He answered, "We always trusted to laboratory findings in these cases." And no doubt they did, but evidently to the exclusion of that close, keen and systematic clinical instruction and observation, without which all medical education is a lopsided farce, for our graduates cannot carry labs. on their backs through the length and breadth of Canada.

I see in this McGill endowment booklet a cut which is very suggestive. It shows a long table set with microscopes, into which an equal number of students are peering. Beneath the cut are the words: "Examining Blood; Making Doctors." The cut may be a figure of speech; putting the part for the whole, with which I find no fault. But it may be another phase of the same figure of speech: putting the instrument for the agent, with a view to emphasize the superiority of laboratories over clinical teachers in medical training. This is the modern trend, and a great advance in turning out bedside incompetents.

I hold in my hand a chemistry exam. paper set by another college for second year students in medicine. It is the kind of paper one would expect for students making chemistry a life study for the different arts, but there is as much heat in a moonbeam as there is of practical value in this paper for the medical practitioner. There is not one question in the whole lot bearing upon the metabolism of the human body.

The same thing is true of the paper in physics. I could not answer one question in either, and I am not ashamed to confess it. In fact, I am glad to have it known, for it is absolutely certain that if I could answer these questions I should have to be classed as an ignorant clinician. No finite being can be a universal specialist. After such a confession, which I know is representative, I can fancy a student well justified in taking up the words of the Master: "Woe unto you Scribes and Pharisees; hypocrites, ye bind heavy burdens and grievous to be borne, upon men's shoulders, and ye yourselves do not touch them with your little fingers." Surely here there is a miscarriage of intention. It was never the intention to make two non-medical subjects; subjects at least so non-medical that we shine in forgetting all but their elements, the heaviest by far in any one year of our prescribed course of medical education.

In this connection, too, let it not be forgotten that specializing much in one subject unfits a person for proficiency in another. A watchmaker can never be a ploughman, and vice versa. So with prolonged laboratory training. It unfits the student for efficient work at the bedside. He can see nothing outside of a test tube or a microscope, and it will take a long time to break him into seeing clinically. At least, he has missed one or more years' chance of doing so—a loss irremediable in his short course of medical education.

And now, when the laboratory-logged graduate—the universal specialist—obtains his degree, and goes out into practice, how long does it take him to find out that what matters for himself and his patients is clinical knowledge, and to curse the academic alphabets that robbed him of professional experience? How many of them will keep fully equipped laboratories in their offices? How many can spare the time to man them, and, lastly, how many will trust to their own findings when reliable specialists are within reach? If there be not one in a thousand, and there is not, what is the sense in wasting time, dissipating energy and unfitting students for clinical observation, by blind-bowing to the present-day trend in medical education?

But I would not be misunderstood. Let our Universities by all means cover the whole field of medical science. Yet I would not add to that the ability to weigh the moon in physics, nor the discerning of the results of millenniums of sun-ray activity in organic chemistry. We cannot in our short lives cover the whole field of science. We are compelled to specialize, even in medicine. How criminal, then, to take the medical student's time and devote it to specialisms, which are of no earthly good in training him to recognize and heal disease? Let the course be graded so as to equip the one who determines to live by his test-tube, on the one hand, and the bedside observer and healer, on the other. Let our Universities realize that there is no other place in the world like the bedside, with a well qualified teacher—no Euclid, no Homer equal to it in developing keen observation, deep analysis, well balanced judgment, and sound, saving common sense. Let them also realize that what fits a student for such training is a practical knowledge of anatomy, and a sound technical knowledge of physiology. I use the word technical here, because a practical knowledge is the life-work of specialists, and then they do not know it all. These, and not the aerial stunts in flying after what may be characterized truthfully, as non-tangent specialisms, are what our students need to equip them for receiving clinical instruction. I have attended the clinics of many noted men in America and England (Osler included) and I never had to recall my chemistry, much less my physics, in order to drink in all that they said.

It never faded from my mind and I transmit the impression to the profession as my last legacy—that caused by Princess Louise's physician, Dr. Anderson, when he went through the wards of the Montreal General Hospital. Being pressed for time, he walked rapidly ahead, led by our clinical teacher, Dr. Ross. "This patient has pneumonia, this one heart disease, this one Bright's, this one consumption, this one is taking belladonna," and so on through the whole ward. With scarcely an exception he was correct. We were overwhelmed with astonishment and admiration. How did he acquire his diagnostic acumen? Not, I assure you, by trying to crowd half a dozen specialties into one short life. What, then, of trying to crowd them into five years of medical training?

So much for our relations to those who come after us. Some head, or someone with a head bursting by what he does not know of medicine may rail at us for impertinence or non-conformity, but our dear mothers—our sweet Alma Maters—will not be affronted when their matured children warn them against the folly and danger of gormandizing over too many strange dishes.

I will now very briefly take up our contacts with things outside. I begin with our schools, since we are guardians of the public health. In these we see overmuch of the hodge-podge cramming, which I have been inveighing against in recent medical education. Somewhere I have seen a cartoon representing a thin, weakly child going to school, with a motor lorry coming behind loaded with her books. They represented the "ologies."

Surely comment is unnecessary. Let us spread our protecting wings over the helpless. Education is not a cramming process. It is a drawing out of things latent, and should pay strict regard to the stages of development. Imitation of sound-language. Imitation of form-writing. The cultivation of reflection-arithmetic. These were well represented by our forefathers' three R's: "Reading, 'riting, 'rithmetic"; and there is more common sense behind them than we now find in the loaded curriculum of our common schools.

I pass on to our relations to the bone-dry movement. In what I am going to say on this subject I will no doubt tread upon very tender corns. Let me offer these sufferers a protective cushion, by assuring them that I do not value temperance less because I depreciate intemperance more. Let me also assure them that I have the utmost respect for the economy of God. Where His economy clashes with that of man, I do not hesitate in my choice. Now in His economy, as revealed in the Book, two kinds of nourishing drinks for the use of man are often joined together; one from the vegetable kingdom, wine; the other from the animal kingdom, milk. They are equally honored in being chosen to figuratively represent the boundless beneficence of God. "Come buy wine and milk without money and without price."

But present-day savants proudly proclaim that the revealed economy of God is a "busted" mixture of good, bad and indifferent. Is it? Take milk as a test. It would speedily rot like meat were it not for the preservative chemistry and chemists of God. He who made the secretion of milk possible made the preservation of its vitalizing properties easy. How? By creating the lactic acid bacillus—the bacillus, Bulgaricus, if you like. God's preserving process does not destroy the vitalizing qualities, the vitamines of milk. In fact, it often enhances their value, as proven by the long lives of the Bulgarians.

So with the juice of the grape, the acme of all vegetable drinks. Its vitalizing properties are not lost, when another of God's chemists turns its sugar into alcohol to preserve its vitalizing properties. We preserve the medicinal qualities of plants by alcoholic tinctures. God was away ahead of us. He conserved the vitalizing properties of the fruitt of the vine by creating the agents for its preservation.

Accordingly, a large proportion of the human race use it, and always did use it, without detriment to health or morals, on the one hand, and with divinely beneficent results on the other. But it is subject to abuse. So are all the best things of God. Do we therefore banish them? Do we banish food because there are gluttons, or women because there are incontinents? Do we stop drilling of soldiers because many of them succumb? Such is not the testing economy of God, for when He tabernacled among men he came eating and drinking subject to all temptations, and laid himself open to the taunt of being a wine bibber and a glutton, flung at Him by the Cephalopods of his day.

Now they are having their own way with His word, as they had before with its Author, and that through the civil power. But St. John saw a strange vision: A harlot riding a beast with seven heads and ten horns. The harlot represents a church, which has left the Gospel of Grace to which it is married, and has gone a whoring after law and force; and the beast with the horns represents the regnant civil powers. He says these shall hate the harlot and shall make her desolate, and naked and shall eat her flesh and burn her with fire; because God hath put it into their hearts to restore to her double. Let Christianity, therefore, beware how it allies itself with coercion to enforce a law that is not of God, and that is not, therefore, written upon the hearts of men. The effort to do so by fines, imprisonment and shooting, rankles, inflames and infuriates. It may take years, but sooner or later, for this prophecy, like all prophecy, must be fulfilled, the horns will turn and rip the rider. The exorcised devil will return with seven other devils worse than itself, and the latter state will be worse than the first.

" 'Tis the sunset of life gives me scriptural
lore,
And coming events cast their shadows before."

What means the rumblings of restlessness and the standing aside from all authority we see in the world to-day? What means the motto, "No God, no church," in Soviet Russia now? What means it, but that our blind coercive legislation is fast piling up tinder for the predicted conflagration? I am not arguing for the return of the bar-room, with its distilled liquors, but I am pleading for the God-given right of even distribution for wine and milk. What God hath joined together let no man put asunder.

But they put up the plea of unfermented wine. This is the last refuge of the ignorant, or, if not that, then of scoundrels. When it can be proven that the ever-present fermentation spore did not cleave to the feet of those who trod the wine presses; or that these spores all died when the rendered juice was stored up in goat skins; then, but not till then, can we attribute knowledge, honor and integrity to those who put up the plea of unfermented wine in Bible days and lands where they have and had but one vintage a year.

I now come, nautically speaking, to the last leg of my course; our attitude to the occult. Here we should realize our limitations. There is a gulf fixed between the physical and the spiritual which nothing physical can bridge Neither microscope nor telescope, nor any other inventive adaptation of material law can reveal the mind and purpose of God, nor pierce beyond the tomb. This has long been accepted as axiomatic in human experience, for very early in history reliance for such information was placed in mediums, speaking it was supposed under the influence of beings from another sphere. I was told by a medical student of ours who had gone through the Maori war that the Maori were firm believers in these messages. So, of all the heathen nations of antiquity, and so of them to-day.

Now in view of the recrudescence of this belief in our day, the question is pertinent, what good did it do them then and what now? Did it minister to the people's health, enlighten their minds or improve their morals? Its deleterious effect upon the health of its devotees was ably shown at our last meeting by Dr. Wm. House of Portland, Oregon. As to its influence over mind and morals, it is reasonable to infer that it can be no better here than where it has been in vogue for millenniums. Nor can our modern mediums ever hope to surpass the occult powers of the Witch of Endor, or the Maori of New Zealand. To what then is the world indebted for raising it from the dark and debasing level into which it sank under the influence of mediums. He is blind who would not attribute it to the interpositions of God, of which the scriptures are a prolonged record. Who can deny that conformity to that record would bring blessedness to individuals, communities and nations—in short, to the world! Why then should anyone, with the least ray of reflection, slap Beneficence in the face, by taking up with that which has been found wanting, after prolonged trial; and which for the good of the race the Omniscient One has so often warned against, forbidden and denounced?

But Conan Doyle is fathering a new revelation. There is nothing to help him out like disbelieving, or discrediting, and discarding or disobeying the old. The radical critics are guilty of the first, for they deny the authenticity of Scripture; and the Bone Drys are guilty of the second, for they prohibit that which the Book allows and recommends. Conan Doyle tells us he began life as a pronounced materialist, discrediting the old revelation because founded upon what he considered impossible super-natural phenomena. He now comes forward with a new revelation based upon phenomena similar to those upon which he previously discarded the old. But there is a vast difference between the deliverances of wizards that peep and mutter—between those of mediums in a trance, or writers super-controlled, and the miraculously accredited messages and messengers of Jehovah. When He spoke the mountain burned with fire and quaked; when His prophets spoke, for they were his mediums and supercontrolled writers, He left no doubt as to the source of their inspiration. They were, therefore, able to cry with Divine authority: "Hear, O Heaven, and give ear, O earth, for Jehovah hath spoken." We should, therefore, be wanting in our Therapeusis if we did not warn against spurious imitations of the old revelation—imitations which for ages wrought misery in the world and many a woe.

Ladies and Gentlemen, there can be no substitute for the old revelation; for He who spoke as never man spoke said:—He who was sent from God said: He, who was in the bosom of the Father before the world was, said: He who conquered death, and ascended up on high, far above all Principalities and Powers said: "They have Moses and the Prophets; if they do not hear them neither will they be persuaded if one rose from the dead."

THE DOCTRINE OF THE PREPARED SOIL: A NEGLECTED FACTOR IN SURGICAL INFECTIONS*

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THE introduction of the germ theory of disease may be said to have laid the foundation of modern medicine and to be the whole basis of our views in regard to surgical infections. The practical application of this doctrine to wounds and to the practice of surgery by Lord Lister is properly regarded as the beginning of modern surgery. From this developed aseptic surgery, opening the whole field of exploratory operations to the properly equipped surgeon. With this development went the growth of the laboratory as an essential agent in enabling us to fit treatment to disease. To-day we are exceedingly dependent upon the results of laboratory investigations, and one might perhaps refer to the present era as the laboratory period. On the other hand, it sometimes occurs to me to think that we at times lose our sense of proportion and become altogether too dependent upon our laboratory associates and at times rely too implicitly upon their results. Certainly the modern medical student often fails to recognize the proper relation of laboratory investigations to the care of patients to such an extent that they become not his assistant, but his master. It is not rare to find in the active, devoted young hospital surgeon a state of mind in which he almost believes that bacteria are the cause of infection. He appears to forget that infection is a result, that bacteria in and of themselves can do nothing except in contact with living tissue and then, often, only under highly special conditions. He forgets that it takes two to make a fight; that there are two essential parties to an infection. Perhaps he may be trusted to learn, as time goes on, that infection is nothing more nor less than the reaction of an individual to a particular kind of an insult and that with two people equally exposed to infection one may acquire it and one may not.

Much as we know about the etiology of disease we are still much in the dark concerning the conditions of the body antecedent or predisposing to infection. We use the phrase susceptibility with a very vague conception of what constitutes susceptibility and we talk rather gravely about immunity while there is still much in this field of which we are ignorant. Of the bactericidal power of the blood and tissue fluids we know something, but not all. We know something of the ability of cells to destroy bacteria, but of the precise conditions which influence their activity there is much that we do not know. Here is an immense field still open for further investigation and here, beyond question, great reputations will be made.

But it is not to this aspect of infection that I desire to-day particularly to call your attention. It is rather to certain other conditions favorable to infection that I wish to invite your attention. Modern surgery is dependent upon our ability to avoid infections which might perhaps be called extraneous. I do not wish to confine this term extraneous to the actual introduction of bacteria into the wound, though they are, of course, an important factor. Rather do I wish to include all those conditions as the result of which wound infection of some degree results. I need not take your time to point out that, though the whole structure of modern surgery is erected upon our ability to avoid infections which do not exist before operation, it is notorious that our success is incomplete. No one of us goes through a busy year without having some patient—even many—whose convalescence is lengthened, whose life is jeopardized and in whom the result of our efforts is less perfect than it might have been, because we did not avoid infection. A certain, though perhaps small, number of the deaths chargeable to surgery are the result of our failure to avoid infection. This appears to me to be one of the weakest points in the armour of the surgeon, and I am not sure that our enthusiastic devotion to the study of bacteriology and our almost slavish adherence to the view that bacteria are the cause of infection has not to some extent drawn our attention away from other factors which are of almost equal importance. Most of you will be able to call to mind the situation which arises in a hospital when in a given period of time there is more wound infection than is the average for that locality and suspicion arises that all is not well. At once we begin to suspect that the sponges and such gear concerned with the operation have not been properly sterilized or that the ligatures or sutures have been carelessly prepared; or failing that, that our assistants or our nurses have failed of their full devotion to the theory of aseptic surgery. Even perchance we begin to investigate the very air we breathe as the source of this noxious happening which has shaken our confidence in our ability to avoid infection. Here we see in its purest form the operation of the Doctrine of the Goat showing our eternal desire to pin on to something or somebody the errors of omission or commission which we believe to have brought about our downfall. As a rule, in my judgment, the surgeon is the chief source of these wound infections, and it must be shown that this be not true before we try to lay the blame at the door of others. I do not at all intend to suggest that bacteria are introduced into the wound by the surgeon. It is precisely because I do not believe that the essential factor here is the introduction of bacteria that I take your time at all in discussing this question. The responsibility of the surgeon appears to me to include not only his liability to introduce bacteria, but also his failure to protect the patient from those conditions which make infection probable. These conditions are manifold and I like to group them under the head of The Prepared Soil. Now these conditions making for infection may be either general or local.

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General Conditions

Under the general conditions we should group those which we may refer to, perhaps rather vaguely, under the phrase, lowered resistance.

Fear—Among these I would put in a high position fear. We all of us are familiar with the fact that the condition of the mind has an important effect on the condition of the body, but we fail sometimes I think to apply this doctrine where it would do most good. Many times I have seen patients whose convalescence seemed to me clearly lengthened, whose wounds healed sluggishly or acquired infection, largely because from the outset they were in mortal terror of the result. The reverse of the picture is perhaps more striking. We have, all of us, seen patients whose optimism and fearlessness were such that they withstood fearful surgical insults without shaking either their equanimity or their healing power. Now fear, particularly in connection with surgery, is not a thing which can be wholly avoided, yet it may be much minimized, and, as I think, to great advantage. Crile has clearly shown that the minimizing of fear in operations upon the thyroid gland under toxic conditions does much to lower mortality. While it is undoubtedly true that fear is an unusually important factor in disease of the thyroid gland, it is none the less an important factor always in surgery, and I feel sure that we shall do well to guard our patients against fear and to surround them by the largest possible amount of protection in order to minimize its affect upon their reaction to surgery.

Starvation—At a somewhat earlier time I should have placed starvation high in the list of those conditions which predispose to infection. Undoubtedly a generation ago, or in the earlier days of abdominal surgery, we deprived our patients of food to an unwise extent and thereby lowered their resistance. I am not sure that we have even yet reached the limit of our willingness to continue patients upon an ordinary diet up to the last moment. Particularly is this important in the old, the feeble and the young. At both ends of the scale of life we meet conditions of diminished resistance to insult, and we must be upon our guard against depriving these patients of their ordinary income of sustenance.

Dehydration—Perhaps under starvation, but not always thought of in that light, should be considered dehydration, the withdrawal of water before operative procedures. Of late years more and more the evidence has been forthcoming that the withdrawal of water is gravely dangerous to many patients under many conditions. I believe that there can be no doubt that the habit of most of us a generation ago of practically withdrawing liquids entirely during the twelve hours previous to operation and very largely withholding them during the same period after operation tended to invite lowered resistance and consequent infection. I entirely believe that the withdrawal of water should be reduced to a minimum; that if patients have suffered from any condition in which their body fluids have been reduced that this reduction should be made good before operation and maintained afterwards. None of us, I take it, withhold water before operation to the extent that we did years ago, but I am not sure that we realize the danger of dehydration quite enough, and doubt if the introduction of fluid both by rectum and under the skin as the antecedent to operations in critical cases is practiced as much as its importance would justify. In the same way I doubt if we pay enough attention to fluid intake after operation, especially in patients in whom liquids cannot properly be given by mouth in sufficient quantities. To sum up what I have to say in regard to starvation and dehydration, I believe we should use every endeavor to maintain patients on a full diet to the last safe moment, and to be sure that their body fluids are at least up to normal before operation and kept to normal after operation.

Anaesthesia—Another important general condition tending to lower resistance is anaesthesia. The last ten years have seen an enormous improvement in the administration of anaesthetics. It is now widely regarded as a rather special business and the days when we entrusted it to the least competent person are happily of the past. Nevertheless, I doubt whether we sufficiently recognize that the proper choice and skillful administration of the anaesthetic is an important factor in the healing of our wounds. For instance, the selection of ether for no reason other than that it is the only anaesthetic sufficiently fool-proof to be within the safety zone of the unskilled anaesthetist may well result in irritation of the respiratory passages with coughing, producing pain and bringing much additional strain upon the sutures of the abdominal wound. Had this patient been given some other anaesthetic better suited to his condition, his wound healing might well have been less stormy.

Length of Operation—And finally, under the general conditions predisposing to infection, I would put the time consumed in the operation. I fear that we are prone to forget that the time consumed in operations is taken directly from the stock of vitality of the patient. This we cannot seriously doubt because we know that particularly with ether and chloroform, undoubtedly the two most common anaesthetics, prolonged operation means a very undesirable action upon the tissues, with definite lessening of the alkali reserve and the production of at least some degree of acidosis. I believe that we should always bear in mind the requirement to get through our work in the shortest time compatible with doing everything which should be done, neither more nor less. A full adherence to this requirement would probably bar from surgery some of those people lacking in manual dexterity and who could under no conditions become dexterous operators. But though I may be judged unkind and inconsiderate, I am not sure that there are not to-day engaged in the practice of surgery many whom the Lord never intended to be surgeons and whose talents would be better employed in some other field. I continue to believe that the minimum expenditure of time is a thing upon which the patient has a right to insist.

Local Conditions

Though I have no doubt of the importance of the general conditions just discussed as factors tending to increase liability to infection, I think it probable that the local conditions surrounding a surgical operation are of even greater importance.

Skin Preparation—In this field, as in the field just discussed, we have made a considerable advance over the conditions of a generation ago. At that time the use of a great variety of highly irritating solutions in the business of preparing the skin for operation was regarded as essential. Gradually we have abandoned one complicated method after another until to-day it appears that ordinary cleanliness is perhaps the most important factor, and that the minimum application of irritants gives the best results. I would, however, still warn against over-preparation of the skin, which, in fact, means a greater reliance upon the ability of tissues to look after themselves if not too grossly insulted.

But I come now to a group of local conditions which seem to me of commanding importance and which are, to my mind, the most important factors in the doctrine of the prepared soil.

Rough Handling of Tissues—Body tissues are undeniably delicate and die under conditions of insult. Therefore, roughness in handling, the use of dull instruments which bite and chew rather than cut, the grasping of masses of tissue in order to control bleeding, the heavy-handed drag on retractors of the absent-minded assistant turned for the moment into an interested spectator, are insults which no tissue can be expected to withstand. Yet it is all too common to see tissues handled in a manner little short of brutal. This results in death of the tissue, necrosis and the production of a medium highly favorable for the growth of bacteria. Those surgeons get the best results whose instruments are sharp, whose touch is delicate, whose eyesight is good, and whose assistants are impressed not only with the fear of God, but with the fear of tissue damage.

Haemostasis—Failure of accurate haemostasis is another factor producing conditions favorable to bacterial growth. Dry wounds heal kindly; wounds containing blood clot are notoriously prone to infection.

Mass Ligatures—Quite along the same line is the inclusion of masses of tissue in a tight ligature where the same amount of haemostasis or better could be obtained by picking up, not a fist full of tissue, but the vessel itself. The practice of strangling a mass of tissue in order to approximate a wound and control bleeding is likewise objectionable, resulting in necrosis and favoring infection.

Our experience in the war shed a bright light upon this question of wound infection. We did not begin to handle our wounds in a satisfactory manner until we learned that the excision of damaged tissues with removal of infectious material in bulk was the key to success. Now in these wounds we do not abolish bacteria. Not only were the surrounding tissues often already invaded, but the conditions under which these operations were done did not lend themselves to first-class aseptic technique. Nevertheless it was clearly shown that the removal of devitalized tissue and grossly infected structures, particularly if done relatively early, was often followed by surprisingly kind healing. This, I think, clearly demonstrated the action of dead tissue and blood clot as a prepared soil upon which bacteria would grow, though unable to conquer the tissue when in a reasonably normal condition. The avoidance, therefore, of those conditions which make a wound favorable soil for bacterial growth becomes a factor of the first importance in avoiding infection. Surgery is still an art, and I doubt whether we value quite highly enough the art of surgery. Manual skill and dexterity are still factors of first-class importance. Asepsis and anaesthesia have tended to bring surgery to a point when speed and dexterity are something short of essential to success. In the pre-anaesthetic, and somewhat less in the pre-antiseptic days, only men of great character could be great surgeons. To-day our patients do not die and therefore we regard our operations as a success. We are apt to charge off wound infection to the carelessness of others and curse roundly our maker of sterilizers or our maker of cat gut, when we should rather look to ourselves as the real sources of the damage. Heavy hands, rough surgery, needlessly long incisions, crushed tissues, impaired circulation from too tight sutures, these and other failures of technique produce a soil prepared for infection. Given the prepared soil infection will follow in a proportion of cases quite sufficient to make up to the total of our failures, without the assumption that it is our assistants rather than ourselves who are to blame.

Now there are certain fields in which this Doctrine of the Prepared Soil is of primary importance and yet in which no surgical wound is involved. Perhaps this is nowhere better demonstrated than in the natural history of infections of the urinary bladder. In parenthesis one might add that failure to recognize the application of this doctrine is a potent factor in the production of bladder infection. Briefly stated, the situation in regard to infections of the bladder is this: The introduction of bacteria into a normal bladder will not cause infection. This may be stated dogmatically, as there is a vast accumulation of experimental work behind it. Even moderate trauma of the bladder will not lead to infection, as shown by the fact that the use of the cystoscope and the ureter catheter even in unskilled hands is rarely followed by observable infection. In fact, did infection follow the introduction of bacteria into the bladder the whole great field of cystoscopy would be non-existant. It is quite impossible to introduce an instrument into the bladder, particularly in the male, without at the same time introducing, from the urethra, organisms. It is at least exceedingly common that the use of the cystoscope, and particularly the ureter catheter, produces slight abrasion of the mucous membrane, as witnessed by the exceeding frequency of microscopic blood in the urine collected from the ureters, and yet it is notorious that these people have no recognized infection.

What then are the conditions under which infection of the otherwise normal bladder will take place? They are the conditions resulting from overdistention due to urethral obstruction. In this way is produced pressure upon the bladder wall. The arterial supply, having behind it a positive force and a force which can be increased automatically, keeps up the nutrition of the tissue, but during this same period of pressure the venous return is gravely handicapped. Now let us assume that this bladder is suddenly emptied and the pressure released. At once active congestion of the whole bladder will ensue; if the pressure has been considerable there may be petechial haemorrhages or even gross bleeding. In the minor degrees there is oedema and soggy devitalized tissue. Here is the prepared soil on which the experimenter has been able, with considerable regularity, to produce bladder infections, and in this way, to our shame be it said, is commonly produced the so-called "catheter cystitis," which has in fact little or no relation to the catheter. We see this happening all too frequently in the conditions of so-called reflex retention of urine following surgical operations commonly in the neighborhood of the bladder. The mechanism is, I think, easy to understand, at least in theory. The machinery of normal urination depends upon the transmission of stimuli through the reflex arc of the bladder neck through lumbar cord to bladder sphincter. If and when these paths of transmission are occupied more or less to the limit with the transmission of painful stimuli from recent surgical insult they are incapable of attending to the minor stimuli of bladder distention and the reflex breaks down. It has been far too much our custom in the past to postpone what we regarded as the evil day when catheterization in reflex retention must be undertaken. When faced with the overdistended bladder we are obliged to resort to the catheter, and when, owing to the prepared soil, infection followed in logical sequence we have sought refuge in the Doctrine of the Goat. We have forsooth cursed our sterilizer of catheters, our nurses, our house officers for faults which are primarily our own. Had we been willing to face the facts at the proper time, to realize that in the absence of overdistention, with its prepared soil, catheterization was an utterly harmless proceeding and, as a result of this logical sequence, had been willing to catheterize before overdistention had occurred, the so-called catheter cystitis in this group of cases would long since have become a surgical curiosity. I believe we may confidently assert that in bladders not the seat of any lesion catheterization is harmless if at no time an amount of urine in excess of a low normal, which may be put at ten ounces, is allowed to accumulate. If in this group of cases we desire to make assurance doubly sure, then we shall do what we can before operation to make the urine itself an uncongenial abiding place for organisms of the colon bacillus group. We must remember that in the infections produced by this organism the urine itself is the soil in which they multiply most freely, and that given a source within the urinary tract from which colon bacilli may enter the urine, enormous multiplication will go on with certainty. We shall therefore be well advised to administer as a routine some formaldehyde containing drug immediately preceding all surgical operations at all commonly followed by reflex retention of urine. Attention to these two points, the avoidance of distention preparing the soil, and the making of the urine a disagreeable climate for the growth of bacteria, will wipe this quasi-surgical infection from the list of our failures.

Let me now briefly recapitulate what I have consumed so much time in saying. We have, I believe, in the consideration of wound infections and allied conditions paid too much attention to the bacteria themselves and too little to the conditions which favor bacterial growth. Complete sterilization of operative fields may be judged impossible and, even though we were able to enter the body without the possibility of introducing pathogenic bacteria, we must still remember that bacteria circulate in the blood far more often than we realize, and will find their way to those portions of the body where conditions are favorable to their growth. No one of us doubts that what one might call spontaneous infection will occur when the skin is unbroken. We cannot, therefore, doubt that if we leave behind us a bruised and bleeding part infection will follow in a certain proportion of the cases. Particularly to those of you who are concerned with the training of the doctors of the future I would commend the Doctrine of the Prepared Soil. I would beg of you to introduce this into the confession of faith of your surgical pupils and to bring them to the high estate of the surgeon duly impressed with the view that they must respect the minds and the bodies of their patients quite as much when under an anaesthetic as they do in everyday life. Instill into them a decent respect for the tissues of others to the end that the art of surgery may come more smoothly to its fruition.

PRENATAL NEGLIGENCE AND LOSS OF POPULATION*

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We have for years been absorbed in the prevention of infant loss, that is, in the prevention of losses from death amongst children born alive into the community. Great progress has been made and such losses have been notably reduced.

But in dealing with what is officially designated as "infant mortality," that is, with deaths of children born alive, we have been dealing with the smaller and less serious sources of our total losses. Back of the losses by death amongst children born alive are the losses by deaths of children in utero or at the moment of birth—whether premature or full term—which are classified usually as stillbirths, and back of this loss again is the loss of prospective children through miscarriages

Of stillbirths we have official records; but such records are not included in our official infant mortality rates. Thus we have officially dismissed stillbirths from consideration as part of our losses; we have allowed the question of whether or no a child at birth breathed once to place that child in the group of live births and so in a group to be considered and cherished, or in the group of stillbirths and so in a group to be disregarded entirely. This is an utterly inconsequential criterion on which to base so radical a distinction. Miscarriages also receive, as a general rule, no official attention, and of course do not enter into the ordinary infant mortality rates. Yet from the point of view of the race both stillbirths and miscarriages are of great importance, indicating as they do potential citizenship lost to the population. These are as much losses as are the losses from infant mortality. The losses occur at an earlier stage, it is true, but the loss is equally conclusive; and is due to causes equally preventable.

We know our stillbirth loss approximately; and if we follow Morgan of Toronto in considering the miscarriages to reach a figure which averages about double that of the stillbirths we are able to estimate for London, Canada, as shown below, that in 1920: (a) about two-thirds of the total loss of prospective citizens before the age of five years (including in the list miscarriages and stillbirths as well as deaths following premature and full term births), occurs at or before the birth of the child, or so soon afterwards as to imply natal or prenatal causation; and is therefore amenable only to preventive measures taken at or before birth; and, conversely (b) that about one-third only of the total loss of prospective citizens occurs as the result of post-natal causes, i.e., of causes beginning operation after birth, and therefore amenable to preventive measures taken after birth. This makes quite evident the fact that ordinary "infant mortality" is but a fractional source of our total losses.

The following tables, constructed in most part from actual figures obtained in London, Canada, concerning the year 1920 illustrate these facts as borne out in such a typically Canadian community of fairly average composition, having a population of about 60,000. Comparative calculations show that the same proportions apply throughout Ontario, perhaps throughout the Dominion.

Total Losses in London, Can., Before Age of 1 year, 1920

Before the 7th month of pregnancy, miscarriages 112 (est.)		112
At or before the 9th month of pregnancy,		
Stillbirths (actual figures)	56	
Premature (actual figures)	30	86
In the first month of life (actual figures)		47
In the 2nd to 6th months, inc. (actual figures		46
In the 7th to 12th months, inc. (actual figures)		31
		322

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*Read before the Canadian Medical Association, Halifax. July, 1921

Total Losses in London, Can., Before Age of 5 Years, 1920

Total loss at or before full term (the miscarriages included are estimated, other figures actual)	198
Total loss, during 1st year (including 39 from prenatal causes; excl. miscarriages, stillbirths and prematures, dying)	122
Total loss during 2nd year	20
Total loss during 3rd year	7
Total loss during 4th year	5
Total loss during 5th year	4
	356

(Two-thirds of the losses following full term births were due to nutritional troubles or to infection.)

Note (a) that a great concentration of loss is found in the earlier stages of development and that a rapid diminution occurs as development increases.

(b) That only 10% of the total loss occurred after the age of one year.

(c) That over half (198) of the total loss (356) up to 5 years of age occurred at or before birth. The losses from miscarriages, stillbirths and premature births are clearly of prenatal or natal origin. But a scrutiny of the causes of death of the group of 122 deaths occurring in the first year demonstrated that 39 of these were clearly natal or prenatal in origin also, i.e., due to natal or prenatal causes, operating after birth, such as congenital defects, malformations, injury at birth, weakness at birth, convulsions, etc. Hence of our total loss up to 5 years of age (356) at least 237 (198 and 39) were due in London to such natal or prenatal causes; such causes thus being responsible for 66.5% of the total loss.

Note that these figures are based on a stillbirth rate of 3.7 (stillbirths to total births, including stillbirths) and (since the miscarriages have been estimated from the stillbirths) on a corresponding miscarriage rate of 7.4. If we take Morgan's estimate of stillbirths throughout the country as averaging 5% of the live births (and miscarriages 10% of the same) then London is low in stillbirths (and miscarriages) by about 25%.

The reported stillbirths in Ontario in 1919 constituted 3.9 of the total births (including stillbirths): Morgan's estimate is therefore well above the figures reported for the Province, and should not be applied directly to them.

The London figure for total loss from natal and prenatal causes (66.5%) if applied to the Province, would probably not be at all an exaggerated figure. The statement then that two-thirds of the total loss of child-life under 5 years of age (including miscarriages, stillbirths and premature who die) is due to prenatal causes, can be checked in part as above against the figures for the Province. Unfortunately the Provincial figures for premature births as distinct from stillbirths and full term births are not available; also Provincial figures showing clearly which of the full term births die from prenatal causes, which from post natal are also lacking. The calculations which are available for 1919 nevertheless show that the calculated number of miscarriages for the Province (double the stillbirths, or 7.8%) may be reduced about 7% without reducing the Provincial percentage of deaths due to prenatal or natal causes below that of London.

Figures applicable to these calculations are still less available for the Dominion than for the Province of Ontario, but may be assumed to run not less than those for Ontario.

Causes of Prenatal Losses

Unfortunately the returns made by physicians do not indicate for stillbirths or premature deaths the conditions resulting in those deaths. Tabulations from the registration records are therefore impossible. For the 39 deaths of infants after full term birth, classified above as due to natal or prenatal causes, "congenital defects," "malformations," "weakness at birth," "injuries during labor" and such like cover the ground. Such terms aid us little, however, in arriving at immediate causation.

The more detailed studies possible in large hospital maternity services make it very probable that prenatal causes may be divided into classes related to heredity, disease and nutrition.

Feeblemindedness, Syphilis and Malnutrition.

Under heredity, feeblemindedness, with all its ramifications and shadings, is perhaps the leading factor in prenatal loss; under disease, syphilis; nutrition includes both under and over-nourishment, the former doubtless the most important.

But such a grouping of prenatal cause is not to be deduced from our registration records, as they are derived from physicians' reports, for syphilis is rarely mentioned; and the other factors might be non-existent, so far as such reports go.

It is true that there are always objections to be made to hospital statistics as non-applicable to the general community, because hospitals tend to deal with certain classes chiefly and with the more unusual cases; and to that extent their results are non-representative.

While this objection is rapidly diminishing because of the greatly increased use of hospitals by all classes and varieties of cases, yet, of course, the most undoubtedly conclusive figures would be those derivable from the whole population through physicians' returns, if only such were to be had.

Why are such returns so barren?

Responsibility of Medical Profession for Establishing the Fundamental Facts

It is the medical profession that handles the individual original case. It is the medical profession which must make the vast majority of the individual returns on which our real knowledge of the facts must ultimately be built. It is the medical profession in its daily labors which should feel the need for reliable facts and should do its share in their accumulation. Good citizenship, a proper sense of service to the community as distinct from that due the individual, a proper pride in medicine, and a deep desire to place medicine on its proper footing—all shared in by most of us—will result in greatly improved returns if the methods are pointed out.

Shortcomings of Present Reports

In reviewing the causes of death registered in London, it was lamentable to see in what a small percentage of cases immediate causes of death had been given at all, even in connection with deaths following full term living births.

In the cases of premature and stillborn children, the mere fact of prematurity or of stillbirth seemed to be considered as an all-sufficient return and no cause was assigned for either condition.

Stillbirth is not a cause of death, but a mere end result. It means little more than the statement "dead" would mean attached to an adult death certificate. It does not even indicate whether the child had died in utero, or died after birth without breathing. But in any case, taken by itself, it sheds no light on the cause of the loss and therefore none on the preventability of the loss.

Other weak, inefficient or useless terms may be quoted as follows: Statements quite meaningless as to immediate cause of death:

1. "Birth."
2. "At birth."
3. "Feeding bottle dirty."
4. "Prenatal causes."
5. "Difficult labor."

On the meaninglessness of the terms No. 1 "birth" and No. 2 "at birth" as causes of death no comments can be made which will adequately do justice to the subject. For No. 3, "feeding bottle dirty," we find an excuse in that the physician evidently had a sociological sense of a duty to the community and to relieve it registered a remote cause, which perhaps was as a remote cause, an accurate one. He, however, failed to appreciate the particular place in the scheme of things which he held as the one trained man in contact with this one case, the only man capable of stating the immediate cause of death. It is no real excuse for him to say that he did a service in his report—for even admitting this, he nevertheless failed to render the service which he alone could render. The sum total of his well meant, but misguided, effort is the rejection of his case from record just as surely as though he had made no return at all. He has given an unclassifiable remote link in the chain and has omitted the one final point which he was asked to supply, which he alone could supply. He has done a duty, but with the best of intentions, he has not done his duty.

The even more remote No. 4, "prenatal causes," might have exactly the same said of it, while No. 5, "difficult labor," is again a remote and not an immediate cause. The child was not in labor and could not have died from labor. The child died of an injury received in the course of birth. It is that injury which should be recorded as the cause of death.

A second set of common terms used which are anatomically or physiologically descriptive, but give little or no clue as to immediate cause, nature of causative injury or disease, how the injury or disease was contracted, follow:

1. "Malnutrition."
2. "Convulsions."
3. "Atelectasis."
4. "Weakness at birth."
5. "Marasmus."
6. "Heart failure."
7. "Indigestion."
8. "Diarrhoea."
9. "Haemorrhage."

"Atelectasis," for instance, is undoubtedly an immediate cause of death, for if the lungs fail to receive air into the air cells, life must soon cease. But atelectasis may arise from many causes: (a) maldevelopment of the nasal or other air passages leading to the lungs, or mechanical obstruction such, as mucus, strangulation by the cord, etc.; (b) intense abdominal distention, which in turn may be due to a variety of causes; (c) maldevelopment or extreme weakness of the respiratory muscles; this weakness may be due to malnutrition, to disease, or to exhaustion following difficult labor; (d) maldevelopment or lack of stimulation of the cerebral respiratory centres; injury to the centres during the process of birth, and so on. It is quite obvious then that the term "atelectasis" by itself gives scarcely more information of a useful character than does the term "non-respiration." The child is dead, and dead because it did not succeed in getting air into its lungs. But why it failed to get air into its lungs is left blank. "Asphyxia" is an even more general term having even less significance, if possible, for it includes "atelectasis" and a wide range of other conditions as well.

"Weakness" (or its technical equivalent, "asthenia"), "indigestion," "convulsions," "diarrhoea," "haemorrhage," are each of them indications of serious disturbances in the body, but none of them indicate the real nature of that disturbance; they do not suggest the possible cause, and block even speculation as to prevention. "Haemorrhage" and "convulsions" are terms so blank that to put either down as the cause of death is practically a complete failure to state the cause of death.

Suggestions

The cause of death in those dying after premature birth is almost always omitted, but should be recorded in all cases and the making of such records constitutes the first of the improvements we would urge. In most of the premature cases in London we are left ignorant on these two points.

It is of value to know how premature the various premature children were, i.e., to know the (intra-uterine) "age at birth." Unfortunately this is seldom, if ever, recorded, and the systematic reporting of this "age at birth" is the second of the improvements in birth registration which should be kept in mind for the future.

Concerning stillbirths also the cause of death is practically never given—probably seldom determined, or, indeed, determinable, without an autopsy. Seldom is the distinction made clearly between stillbirth of premature children and stillbirths at full term. (Premature children, stillborn, are usually registered as stillbirths, not as premature.)

The third improvement would consist therefore in reporting the intrauterine "age at birth" of stillbirths; the fourth would be, the reporting of the causes of stillbirths. A fifth and exceedingly important improvement, the carrying out of which would yield an immense amount of invaluable information, of an exact character, is one in which both physician and parent should co-operate in the interests of the race, namely, the performance of an autopsy in every case of early death, whether the child be premature or stillborn.

The reasons for urging very strongly this turning of attention to premature and stillborn infants may be summarized thus:

(a) The great percentage which losses, under these heads now form of the total loss. Surely no group of this size should escape minute attention.

(b) The susceptibility of this group to reduction by preventive measures, directed to the care of the mother, medically, surgically and through hygienic and sanitary channels. An accurate knowledge of the causes would lead to specific measures to prevent their operation.

(c) The fact that consideration of this group leads to consideration of that phase of infant welfare which aims at the elimination from reproduction of the unfit for reproduction, particularly of those who produce children defective mentally, as well as those who produce children defective physically or hopelessly diseased.

Recommendations

The recommendations which naturally grow out of these studies are here summarized:

(1) Because two-thirds of the total loss of infant life (including miscarriages and stillbirths) is due to prenatal or natal causes (the former greatly preponderating) the medical profession as a whole, all interested citizens, and the public generally should direct their attention especially to the physical condition of women preceding the prospective births of their children—particularly with regard to disease, nutrition and heredity in the broadest senses of those terms.

(2) Because at least two-thirds of the recorded loss of infants born alive at full term are due to nutritional diseases, or to infectious diseases, the former largely dependent on artificial feeding as against proper nursing with human milk, the attention of all concerned should be concentrated on securing to the young infant (a) human milk, (b) protection from infectious diseases. No more startlingly misleading and often fatal teaching exists than that which implies that infectious diseases are relatively light and harmless in young children. The actual facts, as opposed to the traditions show that mortality in children from the ordinary infectious diseases is found especially at the younger ages. The vast bulk of the deaths from the infectious diseases of chil-

dren occur between the ages of 1 and 7, principally before the age of five.

(3) That, to secure these ends, systematic prenatal care for prospective mothers, and systematic infant feeding for young babies, should receive every encouragement from the medical profession, citizens and the general public.

(4) That boards of health should receive the hearty support and intelligent co-operation of the same groups in every effort at minimizing infections of every kind.

(5) That the proper legislative and sociological methods for prevention of the marriage of the unfit should be studied with the object of preventing the reproduction of the unfit, especially of the feeble-minded.

(6) That the proper training and instruction of the fit should be provided by courses in housewifery in the public schools designed for girls from the age of 12 upwards, following the extremely successful plan initiated in New Zealand.

DANGER SIGNS IN DISEASES OF THE GASTRO-INTESTINAL TRACT AND DIFFERENTIAL TESTS*

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THE chief object of this paper is to impress upon physicians the knowledge that certain common gastro-intestinal symptoms may arise from the gravest maladies, for it is remarkable how many forget this. Their mistakes are more from carelessness than ignorance, though sometimes, perhaps, from that habit of mind which leads far afield, since they consider every possible cause for the patient's symptoms except cancer, the early diagnosis of which is important and should have first thought; and it reminds us of that incident in Mr. Pickwick's visit to his friend, Mr. Wardell. It is a beautiful morning, and the beneficent gentleman springs from his bed, thrusts his head through the lattice of his chamber, and is lost in an enchanting reverie. "'Hallo' was the sound that roused him. He looked to the right, but saw nobody; his eyes wandered to the left and pierced the prospect. He stared into the sky, but he was not wanted there, and then he did what a common mind would have done at once—looked into the garden, and there was Mr. Wardell." Now, it is not meant that we should attempt to diagnose a disease because it is suggested in a symptom until we have obtained the evidence embraced in a full history and complete physical examination. You all recall instances where physicians have told patients that their headaches and "bilious attacks" came from trouble with the stomach or bowels or appendix, while the eyes or ears, or mouth or nose fairly called aloud that the source of the mischief lay with them. But, in some patient's history there will appear a symptom which we know is often the harbinger of danger, and we should give this special attention and determine the cause through every means at our command.

First in this symptom-group associated with serious disease of the stomach and bowels, is recurrent diarrhoea, and especially if the patient had been previously well. I have been so shocked by fatalities from unrecognized cancer of the bowel, in young persons, particularly, that I have given this prominent and almost unfailing symptom first consideration, for, if cancer of the bowel be early recognized, I believe many lives may be saved. Diarrhoea of a few weeks' duration, whether in the young or old, and regardless of the manner of onset, would now lead me, with the experience I have had, to think first of cancer, and then of tubercular or other non-cancerous ulceration of the bowel. The history is often deceptive because it states that a number of people were attacked with bowel trouble at the same time, presumably from having eaten of the same food. A careful rectal examination, especially a digital one, should be made at the first consultation, certainly at the time of the physical examination. Even a small growth of the rectum or lower end of the sigmoid (a common location for cancer), can always be found in this way; and there is no such trustworthy means for detection of cancer and even simple ulceration in this locality; an x-ray examination will not aid, and a proctoscopic examination, unless made by an expert, may overlook the trouble. But I am convinced that the x-ray can almost certainly determine the presence or absence of cancer above the rectum or lower end of the sigmoid. I emphasize this exception to the value of the x-ray examination, since its certainty in locating growths in other parts of the gastro-intestinal tract leads many to assume, incorrectly, that it gives final information in this region. If a digital examination of the rectum shows the mucous membrane smooth and soft, then the stools should be examined for blood. The Benzidine test * is so simple that every practicing physician should know and use it, and it takes less time and skill than a urinary examination. If the stools show no occult blood †, the diarrhoea is not caused by cancer, with the rare exceptions of some scirrhous cancers of the bowel, not involving the mucosa, and cancer of the pancreas. Neither is it tuberculosis nor any other ulcerative affection of the bowel. Such a negative finding is a great satisfaction to the patient as well as the physician. A positive occult blood test is invariably obtained in cancer, tuberculosis, and any other serious ulcerative condition of the gastro-intestinal tract, except ulcer of the stomach or duodenum.

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*Read before the Canadian Medical Association, Halifax, July, 1921.

To show what a tragedy may follow neglect to learn the actual cause of a protracted diarrhoea, I state briefly here the clinical record of a young man: A theological student, twenty-four years old, came to me with the history that two months before he had had an attack of diarrhoea which persisted ever since. Previous to this trouble, his bowels had been regular and he had always been well, except for an attack of jaundice when a child. The diarrhoea developed, as he thought, from eating ice cream at a picnic, as others were afflicted in the same way, but they recovered. The looseness of the bowels continued off and on, and the patient treated himself for four weeks and was nothing bettered. Then he consulted the local doctor, who sent him to a hospital. While there he improved, but, returning to his studies, was soon as bad as ever. He had lost seventeen pounds, and was spare, but of fair color, though the general appearance was suggestive of tuberculosis. The abdominal examination showed nothing abnormal except tenderness along the lower sigmoid, but I did not make a rectal examination. The stomach contents and the blood were normal. Two specimens of faeces showed a large amount of occult blood, but no parasites, ova, or tubercle bacilli were detected. I sent him, with a tentative diagnosis of ulceration of the sigmoid, to one of our largest hospitals for complete investigation. It seemed that, while there, everything was done to find the nature of his disease, including an x-ray and even a proctoscopic examination, but evidently no digital examination was made. At the end of two weeks the diagnosis was still doubtful, and a visiting surgeon was consulted upon the advisability of an exploratory abdominal operation. This was performed the following morning, and I was present. On entering the operating room the surgeon looked up and said, "What is your diagnosis, doctor?" I replied, "Ulcerative colitis." He said, "I have found inoperable cancer of the rectum, involving the bladder and other tissues. I am making a colostomy"; and later remarked, "This patient's case ought to be a lesson to all those present." I am sure it was to me. Valuable time and distress of further investigation would have been saved the poor fellow had I made, at his first visit, this examination for which the history called. The surgeon who operated told me that he had nearly made a similar mistake, for he had completed his examination of the patient and was leaving the room when, on second thought, he returned and made a digital examination of the bowel. To his surprise, he found a growth in the rectum, which was easily felt and, undoubtedly, malignant.

When making a rectal examination, if we find the lower bowel empty while the sigmoid is filled or distended, it is evidence of mechanical obstruction, associated with spasm. Under these conditions the obstructing growth may be felt, bimanually, but the spasm has a habit of relaxing and the distention disappears. Then on repeating the examination with the sigmoid empty, we may be unable to feel the growth, and, unless we have felt the characteristic rigid and ragged opening at the location of the tumor, we are undecided. An x-ray examination may not help us here, as shown by this patient's record: I examined a woman 55 years old who had been operated upon six weeks earlier at one of our large hospitals, where she had been sent for diagnosis with a history of pain and distress in the lower bowel, diarrhoea and haemorrhoids. The gastro-intestinal tract was examined by the x-ray with

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*During the war I was unable to get a benzidine preparation that gave satisfactory results. I am now using benzidine, Calco Chemical Co., New York City, which makes a perfectly clear solution and gives excellent results.

†Occult blood was a term suggested by Boas and, as you all know, means blood that is not detected by the naked eye, but must be determined by chemical or microscopic means.

bismuth, and a negative finding reported. Then followed an operation for haemorrhoids, and in three weeks she was home; but when up and about her old trouble returned. She was a large woman, still obese, and was having offensive, loose, and bloody discharges from the bowel. At my first examination the rectum was found empty and the descending colon and sigmoid filled, and by pressing the hand over the filled sigmoid and as high as the examining finger could reach through the bowel, there was felt a mass with an irregular, ragged opening, and I made a diagnosis of cancer. A few days later I examined the patient again, but could find no tumor. An x-ray examination with a bismuth enema was again made by one of the very best roentgenologists, but nothing abnormal was found. When the sigmoid again became distended, the tumor, as before, was easily felt, and the surgeon who had before operated upon the patient made a colostomy for relief of an inoperable cancer of the lower sigmoid.

Persistent loss of weight is a common sign of alarm, and, though common to most diseases, I speak of it here as one of the earliest symptoms of cancer and other grave diseases of the gastro-intestinal tract. We could quickly eliminate cancer should we obtain a number of negative tests for occult blood in the stools, for, with rare exceptions, absence of blood rules against cancer sufficiently advanced to produce noticeable symptoms. On the other hand, the presence of blood is, of itself, only contributory evidence of cancer, but taken in connection with the clinical finding, it is generally decisive, although, in reaching this conclusion, we must eliminate other sources of blood than cancer or ulcer, as nose, teeth, haemorrhoids, and blood-containing food. But this is not the way we should investigate any symptom or group of symptoms, for there is no short-cut to a trustworthy diagnosis; an opinion on any serious symptom, worth anything, depends upon investigation as systematic and complete as we can make it, including every ordinary laboratory test, such as examinations of the blood, stomach contents, urine, and faeces. With this evidence sifted and weighed, a good diagnostician is pretty sure whether the loss of weight comes from cancer or ulcer of the stomach or bowels, or is dependent upon tuberculosis of the lungs, a chronic luetic trouble, or unrecognized diabetes. Besides, I have learned that it is disastrous to allow a decision thus made to be set aside except on indubitable evidence obtained through other tests. Often, however, we need information from what I would term extraordinary means, as the Wassermann test and examinations by the x-ray and especially with the fluoroscope as well as with plates. X-ray examinations of the gastro-intestinal tract are not yet infallible, but I am convinced that in experienced hands they can demonstrate nearly all ulcers and cancers of the stomach and duodenum, and locate most cancers and many other conditions of the bowel. I do not know in how early a stage cancer of the stomach can be detected by x-ray, for who sees the very early stages? The earmarks of very beginning cancer, I think, have not yet been learned.

There is a group of symptoms found in middle life and after, which directs our attention to the lower front chest, under the breast bone and below the ensiform, which is described as a pressure or pain, sometimes very severe, and often accompanied by belching or a feeling that this would give relief. It occurs soon after meals, and soda or hot drinks usually benefit. These are the usual causes: angina pectoris, ulcer, cancer of the stomach, cardiospasm, and gallstones, and more than one of these conditions may be present. I have found, while these symptoms are usually thought to be from indigestion, that the patients are suffering, as a rule, from disease of the heart and arteries, and that the symptoms are anginal in character. Quick differential tests pointing to the heart are: Sudden exertion usually precipitates an attack, and nitroglycerine relieves it, and we will probably find an enlarged heart and low blood pressure. The stomach contents, when expedient to make the test, are quite invariably hyper-acid, which is in keeping also with ulcer, but at variance with cancer; but there is almost always increased gastric motility in these anginal cases, and frequently, also, in cancer and ulcer of the upper portion of the stomach, so that the stomach may expell a test meal in fifteen minutes. Absence of occult blood in the stomach contents and stools, except in rare cases, rules out cancer. So that, by one test and another, we approach the real origin of the symptoms.

When choosing the title of this paper I had forgotten how long it takes to speak of a single disease sign with its illustrations, so that I have been able to consider only three or four, and I have not had time to make even these statements less long. But my first aim has been to urge the necessity of quickly tracing to their sources all symptoms that might arise from serious diseases, especially cancer, and I have tried, also, to show the importance of being able to apply laboratory tests in differential diagnoses. If the younger men know the tests, the older men can and must learn them, for the most valuable are simple ones. Experience, while other knowledge can never supplant it, does not hold quite the same relative value in medical equipment that it did when Doctor Oliver Wendell Holmes (whom I would like to term that incomparable three-in-one—the Autocrat, the Professor, and the Poet) stated that "the young man knows the rules, while the old man knows the exceptions." (1)

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(1) From a valedictorian address delivered to the Graduating Class of the Bellevue Hospital College, March 2, 1871.

RATIONAL EMPIRICISM*

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To some minds the term rational empiricism almost implies contradiction, but it has for long seemed a proper one to me, and I was glad only the other day to come across an address delivered in London some years ago by Sir Dyce Duckworth in which he repeatedly used it.

By rational is meant wise, reasonable, sane, sensible, discreet, or judicious. The term empiricism has many meanings, and it is only in a restricted sense that it is here employed. In Lippincott's New Dictionary it is taken to mean "The knowledge of physic acquired by experience alone." The word comes from the Greek *empeiria,* meaning experience. The word empiric in the same work means an experimenter, and, in Murray's New Dictionary, "One who, either in medicine or in any other branch of science relies solely on observation and experiment."

Empiricism has also been twisted to mean quackery and imposition, but this is really a misuse of the word if one considers its derivation, and it is scarcely necessary to say that it is only in its true sense that it is here employed.

When the clinician or the pharmacologist experiments with any remedial agent and finds that this, let us say, slows the heart, then he is an empiric. But if, having made such observation, he proceeds to theorize as to how this effect is brought about and to argue that because the heart under certain conditions is slowed by the drug therefore it will also be slowed in some other state, then he goes beyond empiricism and enters the domain of theory.

The results of true experiment and observation are usually sound; the results of theory and speculation, although these are very necessary as a ground for further experiment, are fraught with fallacy.

In order to advance in any scientific work hypotheses and then theories are necessary, but these must be constantly checked by further experiment. "Don't think, but try" was the gist of advice given by John Hunter, and no doubt willingly received, when Edward Jenner asked him to theorize upon some physiological question.

How many whole systems of treatment have been founded upon theory which has afterwards proved to be fallacious! I need only mention as examples the humeral theory, the theory of dependence of disease upon phases of the heavenly bodies, and the belief that sickness was due to the influence of evil spirits. Such theories have swayed medical practice throughout the ages and usually not for good.

Lecky (1) wrote in 1873, "Our almost absolute ignorance of the causes of some of the most fatal diseases, and the empirical nature of nearly all our best medical treatment, have long been recognized." And after all, most of our therapy is still empirical in that its value has been discovered accidentally, and in that we cannot explain how it acts. Who can tell when opium was first found to soothe pain and lessen distress? An immense amount of work has been done on this drug since,—with some degree of success certainly in revealing its composition and in showing to which alkaloids it owes its special effects, but the sovereign action of the drug stands where it was handed down to us from unknown times.

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*Read before the Canadian Medical Association, Halifax, July, 1921.

Digitalis is perhaps our next most useful drug. It had a place in the London Pharmacopoeia of 1650 and several subsequent editions (2), but was then, strange to say, dropped from official recognition for over a hundred years, and Withering in the end of the eighteenth century learnt of its value in cases of dropsy from an old wise woman, who had the secret of its use handed down to her.

The favorable action of cinchona in fever and ague was always known to the natives of South America, and Joseph de Jussieu related in 1739 (3) how the use of it was first made known to a Jesuit missionary who, being attacked by intermittent fever, was cured by the bark administered to him by an Indian near Loxa.

In an account of Brazil written by a Portuguese friar in 1625 (4) mention is made of three remedies for the bloody flux (i.e. dysentery), one of which is ipecacuanha, and ipecacuanha still stands first in the treatment of amoebic dysentery.

One might go on to mention nearly every drug that has proved of undoubted value and to show that it has been discovered empirically, but I will not labor the point.

As an example of recent empiricism I might mention non-specific protein therapy. It was found by chance that inoculation with typhoid vaccine relieved gonorrhoeal arthritis, and then that injections of peptone acted almost as well. We are still in the stage of hypothesis as to how these non-specific proteins act, but the empirical fact stands out that they have some curative effect.

As Sir Dyce Duckworth said, "We must not forget that empiricism has often anticipated science in the practice of medicine. Clinical experience has certified the value of some drugs whose action the scientist has long subsequently learnt to explain, and there are still many remedies of which the action is well assured whose exact action remains to be explained on a scientific basis. Empiricism aids scientific medicine by affording suggestions and indications for further research." (5)

The empirical use of diet is instructive. Races of peoples have learned everywhere what diet on the whole best suits them in their environment, and although individuals have often erred, some in the direction of excessive intake, and others in the direction of harmful abstemiousness, still, the general rule holds that most people take what on the whole suits them. From time to time eccentric persons have advocated special systems of diet, and even highly scientific men have urged great limitations of certain elements of it, and have shown, for example, how persons can live for some time on a greatly restricted protein intake, but these ripples in the pool of general experience do not disturb the multitude, which still continue to eat and drink according to the silent calls of their tissues. It is not for a moment suggested that when disease exists the diet should not be most strictly controlled, but among healthy people there exists an innate sensation which tells them what to eat, and when to stop, and this guidance is usually correct. I venture to say that even the members of an audience like this eat and drink according to their inclination, and that very few indeed are aware of their total daily caloric intake, or of the number of grammes of proteins, carbohydrates, hydrocarbons, salts or water that they consume.

While on the subject of diet let me quote from a recent lecture by Professor Halliburton (6). He says, "Before I leave the subject of diet may I unburden myself of a suggestion? Empiricism is not always to be condemned. What we call empiricism is frequently the result of past experience. As an example, take a prescription of cod liver oil, or of butter and cream. A few years ago it would have been impossible to explain why these forms of fat are superior, we will say, to olive oil and vegetable margarine. The mere fact that they are superior was empirical, and now the practitioner has been fully justified, and research has at last told us the explanation, namely, the existence in the fats, which are the more valuable for remedying in nutrition, of a health-giving vitamin. May not this in future be repeated? If you have high blood pressure, why does your medical man tell you you may take fish and poultry and eggs, but that you must abstain from beef and mutton? I can picture a sceptical and argumentative physiologist saying, 'Why! the materials you mention and I am advised to take or refrain from taking are in the main composed of protein, and surely it is not physiological to give me such futile advice.' My answer to this would be, 'True, it is not explicable on physiological grounds. It is the mere result of empirical experience. But wait a few years, and it is quite on the cards that by that time science may have stepped in and explained the puzzle, just as a few years ago it was able to explain why cod liver oil is better than olive oil.' There is probably in the harmful meats some hitherto unrecognized principal, unrecognized because it is present in minute quantity, or it may be the absence of an indispensable material. 'There is one kind of flesh of men, another flesh of beasts, and another of fishes, another of birds.' I wonder if St. Paul ever imagined these pregnant words contained more than what he intended to convey by them!''

The gifts of empiricism to the prevention of disease have been enormous. These were chiefly in the direction of avoiding the unknown causes of infection, and numerous empirical rules of life, such as the Mosaic laws, hold good to-day. These rules were often raised to a religious status.

Natives of India believe that when smallpox is raging it angers the goddess of the disease, Sitala, for the friends of the sick man to go near him, and it is also for the same reason inexpedient that they should travel. Evidently the united experience of many generations had shown that if they went near a case of smallpox they were apt to get the disease themselves, and further if, having been near such, they travelled elsewhere the disease tended to break out where they went. Thus was the value of quarantining empirically established.

We occasionally meet with practitioners who in a lofty way say that one should not use any remedy the action of which cannot be explained. Such treatment they characterize as empirical, using the word in a restricted and narrow sense. But surely this is a wrong view to take. We do not yet know the exact cause of many of the commonest diseases, such as measles, mumps and probably influenza, and it is only as yesterday since the infections producing malaria, cholera and syphilis have been revealed. And yet in the meantime all of these conditions have been treated more or less successfully empirically.

When a therapeutist is told that a remedy X relieves a patient suffering from a condition Y, then his first care should be to sift the evidence in favor of this conclusion, and if this evidence is sufficient to prove that X really influences for good the sufferer from Y, then it is his duty, while endeavoring in every way possible to try to find how X works, in the meantime to use it for the relief of his patient. For instance, some surgeons have recently found that in cases of tympanites the rectal injection of tincture of digitalis is of value. It is hard to understand exactly how the good results are here brought about, but if they do occur then it is wise to use the remedy.

Pharmacology has much the same relation to therapeutics that physiology has to medicine, and just as the more physiology the physician knows the better he will understand disease, which is only altered physiology, so the more pharmacology the therapeutist knows, the better he can understand and explain the action of his remedies. But physiology cannot yet interpret all symptoms of disease nor can pharmacology yet show how all remedies act. As Reilly of New York recently put it, ''The teaching of all therapeutics from the standpoint of pharmacology is a failure,'' and I am inclined to agree with him. The reaction of animal tissues to drugs is often very different from that of the tissues of the human body; and, further, a healthy human being may react very differently to a drug to what a diseased one does; and lastly and very importantly, human beings are not all alike. Even Ford cars and Waterbury watches vary in their working, and how much more human beings, each with his load of hereditary tendencies and idiosyncracies, his mental poise, and his environment.

It is necessary to remember that the practice of medicine is still largely an art rather than a science, and that empiricism has often anticipated science. In Mill's Logic we read, ''The instances of new theories agreeing with old empiricisms are innumerable.'' And Huxley wrote (7), ''Hippocrates certainly knew very little, indeed practically nothing, of anatomy and physiology. .. .. .. Nevertheless, in so far as he, and those who worked before and after him in the same spirit, ascertained, as matters of experience, that a wound, or a luxation, or a fever, presented such and such symptoms, and that the return of the patient to health was facilitated by such and such measures, they established laws of nature, and began the construction of the science of pathology. All true science begins with empiricism.''

In medical treatment we judge by results. Professor Chauffard of Paris said, ''One must not forget that in the matter of treatment it is clinical observation which rests as the final judge. It is the doctor at the bedside of the patient who has the last word and controls all the methods. It is he who decides as to the value of apparent progress. It is through him, it is by clinical observation, that acquisitions are judged as lasting and valuable, or, on the contrary, fall rapidly into oblivion.'' (8)

Empirical medicine will not by itself go very far, but it is the foundation of scientific medicine and it ill becomes anyone to scoff at it.

In nature evolution consists in experiment. Thus varieties occur in tissues and in habits, and if these benefit the organism in its struggle for existence they persist, but if they do not do so they die out. We see evolution in treatment; when any change or novelty in this is successful, it persists, but not otherwise. The difficulty is to judge the success. As Withering pathetically wrote in 1785, ''It is much easier to write upon a disease than upon a remedy. The former is in the hands of nature, and a faithful observer with an eye of tolerable judgment cannot fail to delineate the likeness; the latter will ever be subject to the whims, the inaccuracies and the blunders of mankind.''

In regard to all forms of treatment, empirical or otherwise, we must ''prove all things; hold fast that which is good.''

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NOTES ON LOBAR PNEUMONIA IN FRANCE

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MAJOR Lawrence J. Rhea and the writer had already published some notes (1) on 65 cases of lobar pneumonia which were seen during the first half of 1917. The ''Pneumonia Hut,'' with its 12 beds, was kept on in full swing, and between August, 1917, and August, 1918, excluding about 60 cases following the inhalation of poison gases, 181 cases of pneumonia were under the care of the writer. Lobar pneumonia was diagnosed in 104 of these cases and broncho-pneumonia in 77. Amongst these latter were about a dozen ''influenza pneumonias'' in the first wave of the pandemic. Probably some mistakes were made on both sides in dividing the cases into the two classes, but each case was looked at from all points of view before the final diagnosis was made. The treatment of lobar and confluent broncho-pneumonia is, of course, very much the same, but it is important to aim at an accurate diagnosis. Eighteen of the 104 patients died and practically all of the autopsies were done by the writer.

Notes were made on the usual army case cards, but subsequently all the details, together with an abbreviated temperature chart, were set out in columns on large sheets of ''squared'' paper. These rather elaborate records have been kept and by waiting until now, it has been possible, through the kindness of the Medical Research Committee to follow the subsequent history of many of the cases.

Local or Convoy Patients—The hospital received the ''local sick'' of the Boulogne Base, from nearby camps or off transports. Eighty-six of the cases with 15 deaths were ''local'' admissions; 18 were admitted from convoy, with 3 deaths. As broncho-pneumonia is not so easily diagnosed early in the course of the illness as lobar pneumonia, it is not to be wondered at that proportionately a much larger number of broncho-pneumonias were sent down by convoy.

Length of Foreign Service—One patient was admitted on his first day of duty in France, four on the fifth day, one on the sixth day and three on the seventh day, whilst sixteen had served for two years with the B. E. F. and fourteen for three years or more.

Month of Admission—Eight patients were admitted in August and four died; but three of the fatal cases were in negroes taken off a crowded transport. September, three admissions with no deaths; October, nine, no deaths: November, seven, deaths nil; December twelve, no deaths; January, fourteen cases three deaths; February, one admission, recovered; March, fifteen, with three deaths; April, thirteen, with four deaths; May, ten cases, four deaths; June, seven cases, none fatal; July, five, with no deaths. It is much to be regretted that typing of the pneumococci was not carried out, for such a proceeding might have thrown some light upon the low mortality amongst the autumn patients.

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Age—The majority of the patients were between 21 and 40. There was, generally speaking, a higher rate of mortality amongst the older patients.

Nationality—British Isles, 78 patients with 12 deaths (15%). Canada, three patients, all recovered. Australia, 14 patients, three deaths (21.5%). British West Indies, nine patients and three deaths (33.3%). It is noteworthy that Australians and New Zealanders were very prone to attacks of pneumonia.

Previous History—Five of the patients had had pneumonia before, but none of these died. Seven of the 104 patients confessed that they had been accustomed to large amounts of alcohol, and curiously enough none of these men died. Other records of previous histories seem unimportant.

Clinical Course

Onset—This was sudden in 78 cases and gradual in 36. One came to realize clearly that lobar pneumonia may begin in one or two ways: (1) the patient, apparently in good health, is struck down "out of the blue" with a sharp pain in the side and chill, and in a short time spits up blood or rusty sputum. Or more rarely (2) there is a history of having had a cold or bronchitis for several days and the patient may, or may not, have been in bed; he becomes shivery, more severely ill, and more dyspnoeic, with or without pleuritic pain as the primary serious symptom.

One patient, who had already had pneumonia twice before, was slightly gassed whilst lying out in a shell hole. Three hours later he experienced a sharp pain in the right side on breathing. He was sent down from the C.C.S. the next day. On admission there were practically no signs of gassing: merely slight suffusion about the eyes, but no aphonia. The sputum was glairy, homogeneous, and rusty; not at all like that in the gas pneumonias. Defervescence occurred by lysis on the fifth and sixth days after the upper and lower lobes of the right lung had become consolidated. There had been severe diaphragmatic pleurisy with respiratory rate of 60 and great delirium. Whether the slight gassing had played a part in causing this case of lobar pneumonia is a difficult question to answer, but "gas pneumonias," in our experience, were always of a bilateral diffuse broncho-pneumonic type.

In four cases lobar pneumonia commenced in the hospital after admission for some other complaint. The most interesting of these patients had his tonsils removed and two days later, with a chill and rise of temperature of 104°, lobar pneumonia developed. Crisis occurred on the eighth day.

One soldier at the front received a slight scalp wound in the occipital region. Within 24 hours he was admitted to the 3rd Canadian General Hospital and almost immediately lobar pneumonia developed and with it meningitis (pneumococcal). He died on the fourth day. This case will be more fully described later.

Herpes—Thirty-six of the patients showed herpes and only three of them died. During the previous six months in France, herpes had not proved to be a favorable sign. In several of the cases the vesicles were not on the same side as the lung affected. They were not merely labial or nasal in all the cases; in one instance, which remains vividly in one's mind, the vesicles covered the whole of the right ear, and in another case they were in a large patch below the angle of the right jaw. It is of some interest to note that in one case herpes did not appear until the eighth day, the crisis following on the ninth.

Temperature—In forty-eight of the cases the temperature fell by crisis: 13 on the ninth day and 11 on the eighth. One case showed a critical fall on the fourth day and two patients had their crisis on the twelfth. In thirty-six cases the temperature fell by lysis; in seven cases reaching normal on the eighth day, in four on the ninth and in six on the tenth day. At one extreme the temperature came to normal on the fifth day, and at the opposite extreme this did not happen until the twentieth in one case, and the thirty-third in another.

Amongst the 41 patients who recovered by crisis there were 14 cases of double pneumonia, and of the 36 that recovered by lysis 11 had pneumonia in both lungs.

Empyema developed in two patients after pneumonia, and they were operated upon in France, but are not included amongst the cases of resolution by crisis or lysis given above. They will be dealt with under "complications." There were several other patients who exhibited rises of temperature after crisis or lysis. Their charts are amongst the most interesting of the whole series, but it is very doubtful if we can always supply a satisfactory explanation of all these vagaries of temperature. Even after crisis, in cases where the patient feels absolutely well, the temperature often shows little rises to about 99.5° for a few days. Empyema, of course, is the most frequent cause of persistent fever, and the needle was often used to try and exclude such a condition. The late Colonel John McCrae used to express the opinion that an infection might remain in the pleura for some time after the active disease in the lungs was over and never go on to the formation of a collection of fluid or empyema. There was one instance of pleural friction persisting from the time of lysis on the 13th day until the patient was sent to England with temperature normal on the thirty-third day after onset of the illness. During this time there was an evening rise of temperature to about 100°. Aspiration on the 24th day had failed to find pus. It is gratifying to learn that six weeks after arrival in England the patient was discharged to duty with no mention of any complication being found. Another case was thought to be one of delayed resolution: in England the patient was in hospital for two months as "lobar pneumonia convalescent," and after two months more at a convalescent hospital he was discharged to duty. A further patient had a pneumonia with an anomalous course; it was double and he was very ill, but the temperature came down by lysis on the tenth day, only to rise again gradually on the thirteenth and subsequent days. There were rapid rises, unaccompanied by chills, every day or every other day to 101° or 102° until the thirtieth day, when the fever ceased, and he was sent to England on the thirty-third day. During all this time there had been rusty or bloody sputum, the respirations in the second access of fever were 22-24, but often the pulse was 100-116. Unfortunately no notes of his stay in England are at present available.

In the case of one man of 38, who had typical double lobar pneumonia of the lower lobes, with chill at the onset, rusty sputum, and herpes on nose and face, the temperature came down by crisis on the sixth day, but soon began to become intermittent and later remittent. Pleural friction persisted: there were no chills or sweats, and exploratory puncture failed to find fluid or pus. Resolution seemed to be very slow, but he was sent to England with temperature of 100°, pulse 80, and respirations of 20. Soon after arrival in England tubercle bacilli were found in the morning sputum and a month later he was invalided out of the army. There probably was a chronic tuberculous lesion which was reactivated by an attack of lobar pneumonia.

Extent of Disease and Lobes Affected—In 70 out of 104 cases only one lung was involved, and in 34 cases there was lobar consolidation in both organs. The right upper lobe was affected 53 times in all and alone in nine cases; right middle lobe 24 times, alone once; right lower lobe 74 times, alone 12; right upper and right lower together 26; right upper and right middle 5; right middle and right lower 6; whole of right lung 13. Left upper lobe 18, alone once; left lower 49, alone 10 times; both left lobes 16. There were no cases of consolidation of merely two upper lobes together; 10 cases of merely both lower; merely right lower and left upper in one case. All lobes were affected in two cases and both were fatal. The mortality in the double pneumonias was 29%, and in the single 12%.

The number of double pneumonias would be considerably greater if those cases were included which showed, on percussion and asculation, patches of broncho-pneumonia in the lung not affected by lobar consolidation. Rhea and the writer in a previous paper (1) noted that in some cases double lobar pneumonia was diagnosed before death, but at autopsy what was taken to be lobar pneumonia in the contralateral lung, proved to be a patch of broncho-pneumonia. As will be shown below, the sputum may sometimes help one to differentiate between an extension of the lobar consolidation to another lobe and a patchy broncho-pneumonia. In 11 cases patches of broncho-pneumonia were diagnosed. The sputum was suggestive in six of the eight cases that recovered. In five of them (besides the dullness on percussion noted in all) there were signs of bronchitis, such as large moist râles or piping ones. Three cases died and the diagnosis was confirmed at autopsy. Signs on percussion and auscultation had suggested the diagnosis, but the sputum had not. Patches of broncho-pneumonia were found in three other cases after death, although not diagnosed during life. The sputum did not make one suspect broncho-pneumonia, but in one of the cases there were signs of a generalized bronchitis.

Sputum—A description of the amount and of the macroscopic appearance of the sputum of each patient was made almost every day. The most interesting findings were noted in the broncho-pneumonias, but some points were noteworthy amongst the cases of lobar pneumonia. The typical sputum in the latter class of case, as is well known, is homogeneous, tenacious and glairy and of a reddish, rusty color. At times there may be considerable amounts of pure blood. In contrast with broncho-pneumonia there is generally little muco-purulent matter. It seems justifiable to look upon the changes in color as being due to the gradual alteration in the blood pigments as is seen in the subcutaneous ecchymoses of bruises on a schoolboy's shin. Thus almost any shade of red and yellow may be found, or even of brown. Even in the absence of jaundice, the bright yellow color was sometimes very striking. In one case there was a very curious shade of bluish-green, with no jaundice present. In cases with marked icterus the sputum was moss green and later bright yellow.

A careful examination of the sputum cup may sometimes lead one to make a diagnosis before the physical signs suggest anything new. Thus the involvement of another lobe was several times shown by the presence of fresh blood in the cup.

It was sometimes noted that there were two different kinds of sputum (1) glairy, homogeneous, rusty "mucus," and (2) more or less numerous muco-purulent masses of yellowish-white or greenish-white color. Examination of these cases yielded signs of bronchitis and sometimes of patchy broncho-pneumonia as well as of lobar consolidation. Some of the patients, too, gave a history of having had bronchitis for a week or so before the onset of the lobar pneumonia. As pointed out above, a diagnosis of an added broncho-pneumonia was sometimes confirmed at autopsy. It was observed in some cases that, although absent during the height of the disease, muco-purulent matter appeared in considerable amounts after defervescence. Whitish, branched, bronchial casts were coughed up by several of the patients and are not at all uncommon in lobar pneumonia if carefully looked for. A beautiful blood cast was found on one occasion.

The amount of sputum varied very much in the different patients and at different stages of the disease. Five spat up practically nothing before the fall of temperature. As a rule, soon after the fall of temperature, the sputum decreased very much in amount and only a few cubic centimetres, instead of about one hundred, were brought up in twenty-four hours. Some patients expectorated merely a little clear mucus after the crisis. Over and over again it was seen how little of the extensive exudate in the lung is coughed up during the stage of resolution of lobar pneumonia, for, as ascertained after death on one occasion, the consolidated lung may weigh 6½ pounds, and the other one 1½ pounds only. It also seemed that on many occasions it mattered little if the patient in the height of pneumonia did not expectorate. In the cases of broncho-pneumonia expectoration seemed to be a little more important.

Two cases were of great interest. Although both men were perfectly comfortable, and temperature, pulse and respiration remained normal, they spat up a great deal of very haemorrhagic sputum after the fall of temperature. This is very unusual. What was going on in the lung? Captain McMillan found no bleeding points in nose or throat. Both were cases of double pneumonia, the former patient had his crisis on the seventh day, but bloody or very rusty sputum persisted for nine days after this. He was transferred to England, and, as lately ascertained, convalescence was rapid. He returned to duty in France. The latter patient had his crisis on the eighth day and bloody and very rusty sputum lasted for exactly 14 days afterwards. Transferred to hospital in England, he returned to duty, and in August, 1918, had an attack of influenza, from which he recovered.

Blood Pressure—Readings were taken by the auscultatory method on one or more occasions upon 48 of the patients who recovered, and upon nine of the patients that died. On each of 14 of the patients who recovered, several observations were made; in 10 of these there was a gradual increase of the systolic pressure, with very little change in the diastolic readings. The average age in this group was 28 years. In the four other patients the systolic pressure gradually fell during the course of illness, two of these patients showing a considerable fall in the systolic pressure of 15 and 30 millimetres of mercury, respectively. The average age of these four patients was 34. In all the 14 patients that recovered, there was a tendency for the pulse pressure to increase as the disease progressed. The relation of the pulse rate to the systolic blood pressure was, of course, noted, and amongst the patients who recovered Gibson's rule did not always hold. In two cases, on the day before the fall in temperature, the number of heart beats per minute was greater than the number of millimetres of mercury representing the systolic pressure. These were the only two instances in which this unfavorable relationship between the heart rate and the systolic pressure was found late in the disease. It was a frequent finding, however, during the first few days of the illness, when the heart rate had increased more rapidly than the systolic pressure.

In only three of the fatal cases was the blood pressure taken often enough to tell in which direction the curve was tending. In all three the systolic pressure rose, but the diastolic fell in one case, remained the same in another, and rose in the third. The pulse pressure increased in these three fatal cases. In one fatal case the number of heart beats per minute was consistently greater than the number of millimitres of systolic pressure (six observations). Gibson's dictum, however, was not always true in the nine patients who died. The number of heart beats per minute in another fatal case was always less than the number representing the systolic pressure, and in several other cases this relation was found to hold at the last observation made, on the day preceding death. In several cases the "pulse over pressure" ratio kept changing from day to day, so that now one and now the other number was the greater. The general impression was gained that often the systolic blood pressure was extraordinarily well sustained until just before death and that if one depended entirely on pressure readings for prognosis and treatment, one would often go astray.

Delirium—This occurred in 20 cases, nine of which were fatal. One patient showed a marked toxic psychosis from the seventh day of illness until death on the sixteenth. He was very sleepless, morose, difficult to manage, and could not be induced to answer questions. There was vomiting and retention of urine. A positive Babinski sign was detected on the left side. The autopsy showed unresolved pneumonia of the right lower lobe, there was no meningitis, but a pneumococcus was grown from the heart's blood. During life the urine had contained "albumin plus" and a few hyaline casts. One patient, an alcoholic, had post-febrile delirium with auditory and visual hallucinations for two days after lysis on the sixth day.

The Urine of only 27 patients was examined: "albumin a trace" was noted in 5, "albumin plus" in 18, eight of whom died, and casts in 15, three of whom died. One patient, aged 27, with double lobar pneumonia, showed some oedema of the face on the 9th day. There was some albumin and casts in the urine. The patient had never been strong, but there was no history of previous nephritis. After transfer to England he was retained in hospital for three months with a diagnosis of "nephritis" and was then discharged to duty.

Complications

Empyema was diagnosed in two patients; both were operated upon and recovered. They have not been noted amongst those patients whose temperature fell by either crisis or lysis. One was admitted on the 10th day of disease, and after tapping the chest several times, pus was found. Portions of rib were resected on the 20th and 21st days of disease and two pockets of pus drained. He was sent to England and eventually recovered, for there is a note to the effect that several months later he was admitted to hospital with influenza and was discharged to duty.

The other patient came to us on the 8th day of his illness, with great pain in his right side and expectoration of blood-stained sputum. Eventually we found pus on the right side. It contained non-haemolytic streptococci, and Colonel Bazin resected a rib and drained. Some clear fluid was withdrawn on the 19th day from the left base, but streptococci grew out in culture. On the 23rd day the fluid in the left pleura had become turbid. It was drawn off and replaced by some glycerine and formalin. The patient was transferred to England on the 37th day of illness, and, after being in hospital for several months, he was finally discharged cured.

Tympanites and jaundice are both serious complications and often occur together. The former was found in 13 cases, 8 of which were fatal. Icteroid sclerotics and jaundice appeared to be the more serious, as they were noted in eight cases, six of which proved fatal. In one patient who died showing a marked jaundice, there was also severe hiccough, but no tympanites. Another patient had icterus from the fourth day of disease until the tenth, and defervescence was not complete until the sixteenth. No further notes are available, except that he was discharged to duty after being transferred to England. There was no tympanites in this case. Contrary to expectation, the nine negro patients had no jaundice.

Diarrhoea (unassociated with jaundice or tympanites) occurred in two patients only and both died.

Vomiting was noted in four cases, three of which ended fatally. In one of these there was both jaundice and tympanites, in another jaundice and hiccough, and the third had neither of these other symptoms.

Hemiplegia—Vascular lesions are an uncommon complication of pneumonia, and the case to be described was of very considerable interest. The patient, a neurotic Welshman, aged 31, was admitted from convoy three days after "reporting sick" at the front. He had diarrhoea and functional aphonia. Three days after admission he was suddenly seized with a chill and pain in right upper abdomen on breathing, and his temperature rose to 105°. Double pneumonia developed, he was gravely ill, and at times delirious. The heart was not dilated and no adventitious sounds were heard. The pulse rate averaged about 108, and blood pressure taken on the fifth day was 115 systolic and 80 diastolic. Crisis occurred on the tenth day. The sister-in-charge reported that during the night following the crisis the patient became very irrational, tried to get out of bed, was very peevish and irritable, and had incontinence of urine and faeces. On examination the next morning he was morose and his speech was "like that of a drunken man," the right eye could not be closed as tight as the left one, there was considerable weakness of the right side of the face and on being asked to show his teeth, his mouth was drawn to the left. The soft palate deviated to the left. There was weakness and flaccidity of the right arm and the right leg. Perception of pin-prick was decreased on the right side. Incontinence of urine and faeces continued for several days, the knee jerk on the right became increased and an ankle clonus and Babinski appeared on this side. Colonel Gordon Holmes, Army Consultant in Neurology, examined the patient five days after the onset of the hemiplegia and diagnosed "extensive cortical thrombosis." Gradually strength returned in the right arm and leg, but more quickly in the latter. Speech became more plain. On the twenty-first day after the onset of the pneumonia, or on the twelfth day after onset, of the hemiplegia and aphasia, he showed merely slight paresis of the right arm and face (he could print letters with his right hand).

He was transferred to England, where recovery was rather slow, and he was mentally confused and delusional during the first month, and for some time was regarded as a "mental case." The Wasserman reaction was negative. He was allowed out on parole, but five months later, whilst in hospital, he had another attack of lobar pneumonia with involvement of the left lung, from which he recovered. Up to this time he had been labelled "confusional insanity, following cerebral thrombosis complicating lobar pneumonia." There is quite a full note of the patient's condition eight months after transfer to England. "No mental symptoms now of confusion or delusion. Knee jerks on both sides brisk. Pupils equal and active. Right ankle clonus and planter extensor response. Slight loss of power right arm and leg. Can walk five miles, goes out daily now. Some signs of agraphia. Speaks English with difficulty, Welsh fluently. Arteries thickened, no cardiac murmur. Has put on weight. Discharged permanently unfit."

The Fatal Cases and Autopsies

Duration of Disease—One patient died on the fourth day of pneumococcal meningitis, two on the fifth, one on the sixth, two on the seventh, one on the eighth, four on the ninth, three on the tenth, one on the eleventh day, one on the sixteenth (with unresolved pneumonia), one on the twentieth (autopsy notes are unfortunately lost), and one on the twenty-third day (of double pneumonia, grey hepatisation of the lungs, streptococcic empyema, and septicaemia due to streptococcus mucosus capsulatus).

Extent of Disease—Eight cases showed lobar consolidation of one lung only, but four of these had some patches of broncho-pneumonia in the contralateral lung. Ten cases had double lobar consolidation and in two instances areas of broncho-pneumonia were also noted. Pale pinkish lung (characteristic of commencing organization (?)) was noted in the lungs of two patients who had died on the ninth day of disease.

Effects of accidental puncture of the lung were seen in two of these cases. A negro had double pneumonia and on the ninth day of disease the right base was tapped in search of fluid, but merely a little blood was obtained and he spat up a little immediately after this. He died on the tenth day of disease and late grey hepatisation of the lung was seen. There was a litle clear fluid on the side that had been explored and both layers of pleura were covered with thick plastic lymph. The exact spot, in which the lung was injured when the chest was needled, was readily determined, for, immediately beneath the visceral pleura a mass of blood-clot of the size of a walnut was found.

Another patient had been very ill and had exhibited the signs of a severe toxic psychosis as described under "delirium." Signs of consolidation had first appeared in the lower part of the left upper, shortly after in the left lower, and later still in the right lower lobe. He became very delirious on the seventh day and crisis occurred on the eighth, the pulse and respirations were much decreased in rate, but the delirium continued. On the two following days the temperature was again at 103° and 104°, then became remittent and intermittent to about 100° (but without chills or sweats) for another three days. The temperature on the fourteenth and fifteenth days was subnormal, with pulse of about 108 and scarcely to be felt at wrist. The white blood cells were 18,000 per cubic millimetre. Although no definite localizing signs were made out, it was thought best to explore for pus. An attempt was made to reach the interlobar fissure on the left side by inserting the needle in the mid-axillary line. The patient was very irrational and restless, but his dyspnoea did not seem to be much aggravated by this procedure. No fluid or blood was obtained. The needle was withdrawn and inserted at the left base. To our surprise, it could be freely waggled about in the pleural cavity and it was realized that a pneumothorax had been caused by the previous puncture. The patient died a few hours later. The autopsy revealed a large mass of unresolved and partially organized pneumonia of lobar type in the right lower lobe. On the left side pent up air escaped from the pleural cavity and a collapsed lung was found. No consolidation remained, but the bronchioles at the base of the upper lobe were filled with pus. There was no empyema. The needle had ruptured a small bulla at the lower border of the upper lobe and on the pleural surface was a small flake of yellow lymph and in the lung a tiny haemorrhage. From birth the patient had been handicapped, for there was a marked grade of hypoplasia of the heart, spleen and kidneys. It was little wonder he succumbed to an acute infection. Blood culture after death yielded a pneumococcus. Examination of the brain showed no gross abnormality. This was the second time that the writer had caused pneumothorax by exploring a chest for fluid, but on the first occasion, in a case of broncho-pneumonia, no untoward event followed. He now uses a trocar, withdrawing the sharp stylet as soon as the parietal pleura is reached.

Pleural Cavities—Two of the cases of empyema diagnosed and operated upon have been described; both recovered. Five patients, whose deaths occurred betwen the fifth and eleventh days of disease, showed grey hepatisation of the lungs and also a varying amount of turbid fluid in the pleural cavity on the same side. A sixth patient died on the twenty-third day of disease; all through the illness there had been signs of a spreading pneumonia of both lungs and there was rusty sputum until the end. On the day before death the left pleural cavity was explored and three ounces of turbid fluid, which contained streptococci, were withdrawn. At autopsy there was moderate amount of turbid fluid in the left pleura, but no empyema on the right side. The whole of the right upper lobe, except the anterior border, showed grey hepatisation, there was no middle lobe, and the lower one was very small and only partly consolidated. The left lung throughout was in the stage of grey hepatisation, but the pneumonia in the lower lobe was plainly at a later stage. The heart's blood contained a streptococcus mucosus capsulatus.

Pericarditis—This was diagnosed in only one case before death, when a faint to-and-fro friction, synchronous with the heart-beat, was heard at the base of the heart. At the post-mortem on the eleventh day of disease the pericardium contained slightly turbid fluid and a smear showed pneumococci. Including the above case, turbid fluid with a varying amount of fibrin and infected with pneumococci was found four times post-mortem.

There was one instance of a typical "bread-and-butter" heart in a negro. In two of these cases there was an accompanying turbid effusion (pneumococcal) in the left pleura only, one with it in the right only, and one in which there was a very thick deposit of "plastic lymph" on both sides. No pericardial friction was heard in any of the cases that recovered. No cases showed endocarditis.

Meningitis—The only example of this complication has already been briefly referred to under "onset." The first patient, aged 22, received some slight wounds of the face and one of the scalp in the left occipital region. He was admitted to 3rd Canadian General Hospital within 24 hours with "signs of bronchitis and meningitis." On examination of the wound of the scalp 3 cm. in length, no fracture of skull could be detected. The case was transferred to the Pneumonia Hut on the third day of disease and put under the care of Captain A. M. Yeates, who was in charge in the absence of the writer. He was rather irrational, restless and in a semi-conscious state, but on arousing he talked intelligently. He could not remember incidents of injury or illness. There were signs of consolidation of the right upper and middle lobes. No paralysis was made out, there was some stiffness of the neck; knee jerks were increased and ankle clonus was present. Captain Yeates, greatly to his credit, diagnosed meningitis as a complication of the pneumonia and not of the head wound direct. At 11.30 p.m. on the third day the patient suddenly became comatose. A spinal puncture was done and cloudy fluid under increased pressure obtained. A smear showed many polymorphs and gram positive diplococci with definite capsules. Death occurred two hours later. The temperature had varied between 104° and 101.6°. At the post-morten grey hepatisation of the upper and middle lobes of the right lung was found.

There was no spreading cellulitis about the scalp wound, no gross injury to the pericranium, and no fracture of the skull. No lesions of the dura, pia-aracnoid, or brain could be attributed to the missile. There was a very diffuse purulent exudate of greyish yellow color, especially over the base and posterior half of the brain. The blood vessels in the enveloping membranes of the brain were injected and irregularly distributed pial ecchymoses were found.

Blood-culture after death was done in seven cases and yielded pneumococci five times. Streptococcus mucosus capsulatus was found once and in the remaining case the blood-culture was sterile.

It is with pleasure I express my thanks to the Nursing Sisters, Ward Masters and Nursing Orderlies who at one time or another were in the "Pneumonia Hut." One and all were untiring in their efforts. It was very hard work for the Sisters at the best of times, and in the midst of the night air raids they kept at their post of danger and comforted the sick. This resumé of the work would have been impossible had they not so kindly copied temperature charts and helped in many ways. Corporal Lunn of the Royal Engineers also did much in preparing chart records.

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SARCOMATOUS ABDOMINAL TESTICLE IN A HERMAPHRODITE

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THE occurrence of a sarcomatous testicle is none too common, a sarcomatous undescended testicle is still more uncommon. A sarcomatous undescended testicle in a hermaphrodite seems unusual enough to justify its being reported.

The subject, F. W., aged thirty-four, presented itself complaining of a rather large tumor in the lower abdomen. The individual was dressed like a man, looked like a man, had a man's voice, and came in company with his wife. When the latter had retired the patient at once informed us that he was not like other men physically. An examination revealed mammary glands normal for a male, a most rudimentary penis without a meatus, and the hair over the pubes was in a straight line transversely as is seen in a female. There were labiae majorae of a female, but the labiae minorae were fused with the deeper tissues which closed what, on superficial inspection, looked like a normal vagina. There was the usual amount of hair about the external labia for a female. The urethra terminated in a meatus at the usual site of a female. There were no testes discernable.

The examination for the ailment complained of revealed an abdominal tumor situated medially and rising from the pubes to a point almost as high as the umbilicus. It was quite regular in outline, smooth to the feel and hard to the touch. It was not of the consistency of a normal pregnancy. It looked about like a fibroid of the uterus.

A provisional diagnosis of a sarcomatous undescended testicle of a fibroid uterus was made, with the former as the more likely. This was explained to the patient and an exploratory laparotomy was advised.

At operation the mass proved to be a very vascular tumor filling the pelvis and rising up as described above. It was widely and firmly adherent, so that at no stage was there the slightest prospect of ablation of the tumor.

Examination of the pelvis was impossible, though curiosity prompted a serious attempt at ascertaining what it contained. A fair sized section of the mass was removed for microscopic examination. The site bled very freely and had to be packed.

The microscopic examination proved the mass to be sarcoma of a testicle.

The patient was given Coley's serum. He left the hospital in two weeks and the serum was continued at home. The mass never reduced in size and death occurred in about three months. The patient was at a distant point in the country and no autopsy was done.

The case has been referred to as a hermaphrodite. Steele (1) says: "True hermaphrodism implies the presence of a testicle secreting spermatozoa and of a functioning ovary in the same individual." Since there are at least two functions for both the ovary and the testicle, it would have to be determined which of these functions must be fulfilled in each case before the subject can be defined as a hermaphrodite. The functions consist of the production of the sex cell and the production of the internal secretion in each case. It is well argued by Swale Vincent (2) that the production of the spermatozoa is not the function that gives to the animal the qualities of the male. He is of the opinion that the essential thing is the internal secretion, that it not only produces the qualities which are assigned by all as those of a male, but that the internal secretion maintains these qualities. Bouin and Ancel are quoted by him to prove his contention.

Moreover, in the workaday experience of many physicians, a childless marriage has been proven to be due to the absence of spermatozoa in the husband. Albeit, he would be classed by the most critical scientist as a true male.

It seems to us, therefore, that the crucial test of a true hermaphrodite is whether the internal secretions of the ovary and testis are present. The presence or absence of spematozoa and ova is of less importance.

Whether the person referred to in this article was a true hermaphrodite or not we are unable to say. There were unmistakable physical properties of both sexes present.

The most practical question which arises in this case is the one of the undescended testicle. Occasionally in the undoubted male an undescended testicle can not be at all readily placed in the scrotum by operation. What shall we do with it? If it is left in the abdomen is it likely to undergo sarcomatous degeneration? Grant, in discussing his case of sarcoma of the abdominal testicle, says: "There should be no question of the propriety and advisability of removing the testicle in early adult life in case only one testicle is misplaced, whether the testicle is in the inguinal canal or within the abdomen." Coley, in the discussion, said he had formerly doubted that an abdominal testicle was more likely to become malignant than a scrotal one, but that he had changed his mind. He goes on to say: "With regard to the treatment of this condition, I do not agree with Bulkley, who advocates the removal of every abdominal ectopic testis unless double. In cases in which the testis does not descend before the age of puberty, it is possible in nearly every instance to bring the testicle down into the scrotom by Bevan's operation. In rare cases in which the testis cannot be brought down, I believe it is wiser to remove it rather than to place it in the peritoneal cavity."

It is interesting to speculate on the question of the possibility of transplanting a sex organ to a hermaphrodite and thus make the individual take on more of the characteristics of the one sex or the other. Mayo is quite right when he says that the cases where this could be done with benefit must be very rare.

In conclusion, the writer ventures the opinion that the problem of the abdominal testis is one of importance. In case only one organ is intra-peritoneal and it cannot be brought down into the scrotum, its ablation is advisable because of its liability to malignant change. In case of the hermaphrodite, or a normal male, with both testicles in the abdomen, unless these can be brought into a normal scrotum they should be removed, and we suggest the subcutaneous injection of extract of the interstitial tissue of the testis, as was done experimentally by Bouin and Ancell.

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MODERN MEDICINE AND THE GENERAL PRACTITIONER*

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DURING the last year the writer has enjoyed opportunities to meet and discuss the problems which relate to modern medical education and to medical practice of to-day, with eminent physicians and surgeons of Great Britain and Canada. Apparently the problems which to-day concern the welfare of the medical profession and the general public are essentially the same in Great Britain, Canada and the United States. Because of our mutual interest in these problems I venture to address this association upon the subject of this paper.

The chief problem is intimately related to the question of how the knowledge possessed by modern medicine may be applied most efficiently and practically for the benefit of the general public. Necessarily the chief agent in this work is now and must always be the general practitioner of medicine.

Modern Medicine

Modern medicine may be defined as a broad and comprehensive field of learning which has been developed by scientific investigation. During the last fifty years the study and evolution of chemistry, physics, physiology and bacteriology and their clinical application in later years, has changed and broadened medicine from an art of observation and a collection of alleged facts based upon empiricism, to an applied science founded on laboratory and clinical investigation. This does not imply that medicine is now or that it ever may become an exact science, but by means of continued laboratory and clinical research the modern medicine of to-morrow will be characterized by greater learning and will be of more value to mankind than that of to-day.

Scientific methods of investigation in pathology and bacteriology have brought us the valuable knowledge we now have of infectious microorganisms, infectious disease, epidemiology and immunology. Vast as is our knowledge of these subjects, we have only made a beginning in establishing the fundamental basis for further investigation in these important subjects. We have some understanding of the reaction excited by the infectious invading miscroorganism with the tissues of the host. We have some understanding of the life cycle of infectious microorganisms. We are able to detect and estimate the offensive and defensive substances in the blood and other tissues of the host. We are able to utilize the presence of specific agglutenins and precipitins and the Bordet phenomenon of complement deviation in diagnosis. We have a broad comprehension of the methods of transmission of infectious diseases from man to man and a corresponding knowledge of disease prevention. In the establishment of these scientific facts we have obtained possessions of specific antitoxic sera of inestimable value in the prevention and cure of diphtheria and tetanus. We have also secured antibody developing antisera and antigens of material curative value in dysentery, epidemic cerebro-spinal meningitis and type I pneumonia and of prophylactic value in typhoid and paratyphoid fevers, cholera, dysentery and plague.

Aseptic surgery is a product of exact scientific research. A thorough application of the principles of asepsis combined with technical skill and experience enables the surgeon to invade every part of the body with a resulting saving of life and invalidism. Modern operative surgery has been able to add to the knowledge of disease by the opportunity to visualize and study the living morbid anatomy of progressive disease.

The study of physiology and physiological chemistry has brought about a revision of the older anatomical conception of disease. While to-day we are still interested in the morbid anatomical lesion as to its etiology, nature, evolution and its modification by management and treatment, we have quite as much or a greater concern in the coincident functional disorder. That is, modern medicine has been and will continue to be occupied with the investigation and elaboration of methods by means of which we shall have an understanding of the function of organs and tissues and the nature and significance of the reciprocal relationship of morbid reactions. In other words, a study of pathological physiology is now recognized as of the greatest moment in modern medicine.

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The study of normal and pathological physiology has given us a better understanding of animal growth and nutrition. An understanding of animal growth and general nutrition has involved a study of food values and especially of what has been properly termed a "balanced diet" with its contained essential vital constituents, the "vitamines." This has implied a study of metabolism embracing a knowledge of blood chemistry, the alkaline reserve of the body, the hydrogen ion content of the blood, the carbon dioxid tension of the alveolar air, kidney function, the function of the gastrointestinal tract and the auxiliary organs of digestion—the liver and pancreas, the function of and interrelations of the secretions of the ductless glands, and other normal and abnormal physiological processes.

Modern clinical medicine as an applied science embraces such a vast field of knowledge that it is beyond the powers of any individual to acquire the necessary learning, experience and technical skill to efficiently practice in the whole field of medicine. A recognition of this has led to the necessary specialization in medicine and the evolution of the internist, the surgeon and the other specialists in the narrow fields of medicine and surgery. This evolution in specialism has been coincident with the invention of instruments of precision and the elaboration of laboratory methods of physical and functional diagnosis which require such technical experience and skill in their application, that they are valueless to the general practitioner. By these means, diagnosis both physical and functional, gains in precision, and at the same time becomes more and more complex. We all recognize the enormous benefits which these modern methods of physical and functional diagnosis have brought to medicine and that their utilization will continue to bring us additional useful knowledge. But, these complicated methods of diagnosis are of use chiefly in investigation rather than in routine practice. A modification and simplification of some of them may enable the general practitioner to apply them in routine practice with profit to himself and the patient.

The General Practitioner

The general practitioner who is essentially the family physician, is the most important factor in the practice of medicine. In any plan which may be made for the improvement of medical practice, domiciliary visitation must be considered as a necessary fundamental prerequisite in the conservation of health and in the treatment of the sick and injured. It is fundamentally necessary that intimate relations must exist between the physician and the patient. This intimacy the family physician possesses.

If the general medical practitioner is to occupy the important position which modern medical practice demands, it will be necessary to rehabilitate him that he may be qualified to do his part of the work with due regard to efficient service, adequate financial reward, opportunities for social enjoyment and betterment of himself and family.

The first essential is the more sensible and practical education of the medical student. In the United States and I believe in Canada, too, there is need of a decided modification in the curriculum of the medical school. The present curriculum tends to specialism of the undergraduate medical student. As a result there are not a sufficient number of broadly trained general practitioners. The recent medical graduate lacking the necessary broad training in general medicine and inadequately trained in any given specialty, is nevertheless encouraged toward specialism and toward urban practice.

We may have a better conception of what the education and training of the undergraduate medical student should be if we will consider what are the obligations and responsibilities of the general practitioner to the community he serves. The family physician is responsible for the safe and sane treatment of the family in illness and injury, and it is his duty to preserve individual and community health. His general education must be broad inasmuch as he counsels and advises the family in regard to all problems which concern it in relation to individual and general hygiene, public sanitation, education, community obligations and responsibilities and their care in sickness and injury. Therefore, he must have a good general knowledge of the principles of epidemiology, immunology, sanitation, medical jurisprudence and sociology that he may act rationally when confronted with the problems which relate to the application of tried and proved measures of disease prevention for the protection and welfare of the multiplied families—the communities for whom he is responsible. He must advise, guide and safeguard the expectant mother through gestation. He must so manage the labor that it will terminate within a reasonable time, if possible, without instrumental interference and without serious injury to the mother and child. He must be able to meet obstetric emergencies and especially to recognize serious complications at an early stage of labor so that consultation may be secured if he is alone not technically able fully to safeguard the two lives for which he has assumed responsibility. He must be able to give the best advice and management in the care of infants and children. This implies a practical knowledge of modern infant and child welfare work. He must understand the principles of psychology which will enable him to recognize psychopathologic conditions in childhood and in adult life. For abnormal mental conditions and their management and treatment he will usually not assume responsibility, but will be able to direct the related responsible individuals to physicians qualified in this work. He must be well trained in diagnostic methods and generally able to recognize existing morbid conditions by physical examinations and to apply simple functional tests. His long acquaintance with families will enable him to trace the beginning of pathologic changes and to apply the proper management and treatment while the condition is remediable.

He should know what management and treatment to give. If he has been properly trained and educated, he will command a selected few, tested and tried pharmacological products which he will be able to use with skill and usually with great benefit to the patient. His knowledge of the principles of immunology and bacteriology will enable him to apply recognized specific serums and a few antigenic vaccines with judgment and skill prophylactically and therapeutically. In the general management of his patients he will utilize rest, a proper environment, and, so far as available, physical treatment. Usually he will be able to command hydrotherapy, thermotherapy and occupational therapy and, in some instances, electro and masso therapy. He will have the proper conception of the value of calisthenic and other active exercises in the restoration of function of the heart, skeletal muscles and joints. He will understand asepsis and be able to perform minor and emergency surgery, and especially manage fracture of bones and uncomplicated joint dislocations with confidence and ability. He will know his own limitations and will safeguard the lives and health of his patients by reference of major surgical conditions, with which he is unable to cope, to qualified surgeons.

With this brief statement of the functions of the general practitioner, it is not necessary to enumerate the various steps which should be taken in the training of the family practitioner. It is plain and evident that he must have a good knowledge of general and physiologic chemistry, of human anatomy and physiology, of pharmacology, of general pathology, including morbid anatomy, of epidemiology, immunology and psychology. In the clinical branches he must have the training of his brains, special senses and hands in recognition of disease. He must learn to use efficiently the simple diagnostic methods supplemented by instruments of precision and laboratory tests. He should have experience in the application of these methods of diagnosis by constant and daily study of disease as expressed in ambulatory and ward patients. He must have an opportunity to observe the etiologic relation of occupation, environment, social conditions and other factors to disease. He must learn and recognize the importance of community as well as individual disease. He must have the opportunity to observe the results of medical treatment and management and the final condition of the patient after operative surgery. He must have thorough training in the principles of asepsis and in the technic of operations upon the cadaver and lower animals; must witness minor surgical operations, and especially the emergency surgery, including that of practical training in the diagnosis and treatment of fractures of the bones and of dislocations of the joints. He should have practical training in medical jurisprudence. The training in pharmacology and toxicology should be supplemented in the clinical course by practical observations of the effects of drugs and poisons on patients. He must have an opportunity for the practical study of dietetics and dieto-therapy. He should have practical training in child welfare work and in the modern methods of infant feeding. His training in obstetrics should be practical and should include the prenatal and after-care of the mother and infant. He must have practical experience in the measures of disinfection of the sick room, of the excretions of the body and of other measures of control of the communicable diseases. If an interne year is a pre-requisite to graduation, the major part of this training should be mainly devoted to diagnostic methods, to the observation of the progress of disease and to the modification of the morbid process by management and treatment. The investigatory work conducted by the faculty and the staff of the hospital, which is a necessary part of the modern medical school, should produce a scientific hunger in the medical student which will be satisfied only by increased effort on his part to give the best that is in him to the work in hand. The bright and energetic student may find an opportunity to apply himself to some form of elective investigative work with much benefit to himself. But the large majority of the medical class will be fully engaged in the routine work which this broad and necessary practical training demands.

The educational training, both academical and medical, does not fully qualify one to become an ideal family physician, for he must be a man of character whose daily life is a practical expression of honesty, morality and resourcefulness in service.

Post-graduate Training of the General Practitioner

The general practitioners already in the field are very much in need of short-term review courses in methods of laboratory and clinical diagnosis and in modern methods of treatment. The university medical schools and general hospitals should assume this responsibility and organize review courses especially adaptable to the general practitioner. If every university medical school will make this post-graduate review available to a small class of physicians two to more times each year, great benefit will be afforded the public and the medical profession. Medical alumni associations and medical societies should co-operate with the medical schools in this needed undertaking.

The Need of Improvement of Social Conditions to Attract Practitioners to Rural Districts

In many rural districts of the United States there is a lack of a sufficient number of practitioners of medicine to care for the sick and injured of the community. This is due to several factors, among which may be enumerated: Specialism in medicine and the attraction which the city offers the medical practitioner in opportunities to enjoy the comforts of modern life, professional advancement, close association with colleagues and other benefits; and, on the other hand, the lack of the necessary conveniences of modern life, of amusements, social and other, of good schools and other conditions which are demanded by the individual who has had the opportunity of a broad education. The average age of the practitioners in the rural districts in the United States is fifty or more years, an indication that graduates of recent years have settled in urban communities. It is necessary, therefore, that we shall not alone correct the methods of the training and education of medical students to better qualify them as general practitioners, but we must also attempt to improve the social conditions, including education, in rural districts, and at the same time must supply the rural practitioner with facilities for the diagnosis and the treatment of his patients.

Of the various suggestions which have been made, for the improvement of the health and social condition of rural communities, brief mention is necessary of compulsory health insurance and of state medicine.

Compulsory Health Insurance

Health insurance has been and still is advocated by many social reformers of the United States as a panacea for all material and economic ailments of the public. A majority of the medical profession of the United States is opposed to it on the rational ground that it is class legislation which benefits the insured alone, tends to the moral and financial degredation of the medical profession, interferes with the patient in the selection of the individual physician, encourages inefficient medical practice and other evils not necessary to mention. It is the consensus of opinion of our best qualified citizens that health insurance is impractical and unsuited to the health and medical practice problems of the United States. Considerable confusion seems to exist in this country in regard to the actual results of health insurance as it is applied in Great Britain. Apparently it does not meet all of the health requirements of the people of the United Kingdom inasmuch as a committee appointed by the Ministry of Health is engaged in an investigation in regard to the establishment of health centres of which I shall speak later.

State Medicine

State medicine, which embodies more or less paternalistic health and medical care of the public, has its advocates with us. The dangers incident to bureaucracy and centralization of operation with consequent inefficiency, the danger of eradication of the family physician and the increased incidental Federal or State taxation are objections which are concurred in by the thinking portion of the public.

Community or Health Centres

Based upon facts established by experience that health and welfare measures which are really beneficial must be paid for and operated by the people of a community, there has been established by legislative action of several of the States of the Union, the statutory right for the organization of community or health centres of territorial districts comprising one or more wards, one or more townships or one or more counties.

The fundamental idea in the organization of a community centre is the improvement of the living, the social, the educational and the health conditions of the community, which shall be paid for by the voluntary direct and indirect taxation of the people and shall be operated by the people of the community themselves subject only to certain standards fixed by higher authority. The Federal and State government should encourage the organization of such community centres by making uniform standards of organization and operation of all centres within its borders, but give financial subsidies only to those communities which are so sparsely settled that preliminary financial aid is required in their establishment.

In the operation of these community centres the improvement of living, of social, of educational and of health conditions will be participated in by the medical profession, the churches, all other social betterment organizations, boards of education and the general public. The problem of the improvement of the health and the facilities for the treatment of the sick and injured is the chief one, and in this the initiative and the responsibility must be assumed by the medical profession. Every community of health centre will have its hospital for the care of the sick and injured and of the expectant mother, with facilities for the segregation and care of communicable and contagious diseases. In some centres there may be a main hospital with small branches at other locations in the district. The hospital will have its diagnostic centre with all the facilities for laboratory and physical diagnosis. Secondary diagnostic centres in lieu of branch hospitals may be located in various parts of a district. The superintendent and other personnel of the hospital and diagnostic centres may be appointed by a board of administration created by the people of the district. All medical and surgical treatment and other activities, including the inspection and physical training of school children and other health measures, are distinct responsibilities of the medical profession of the community centre. Every legally qualified practitioner of medicine within the district should be able to command the diagnostic facilities of the centre and the use of the hospital for the treatment of his patients subject to rational regulations formulated jointly by the superintendent of the hospital and the organized medical profession of the centre. Every legalized practitioner of the district will carry on his practice in his office, in the homes of his patients and in the hospital, at all times maintaining his individuality and the family intimacy which is so essential to efficient medical practice. The hospital would naturally be the centre of community improvement and service. Its library composed of medical and health literature would be the meeting place of the organized medical profession and of other societies interested in the improvement of the living, the social and educational and the health conditions of the community. Suggestions for the organization and administration of community or health centres have been made recently by the writer.*

In Great Britain the need of available diagnostic and hospital facilities for the general practitioner of rural communities and small cities is evidenced by the report of the Consultative Council of Medical and Allied Services of the Ministry of Health of Great Britain.†

Next week at Boston at the annual meeting of the American Medical Association the Council on Health and Public Instruction will make a special report on this subject. Evidently a large number of the medical profession of Great Britain and the United States recognize the need of additional and adequate facilities for the diagnosis and treatment of the rural population by the general practitioner. I think it is equally essential to make rural living conditions attractive for the public good and to induce medical practitioners to select a country rather than a city practice.

Professional Relationships of the General Practitioner

I have attempted to show that the efficiency in service of the general practitioner is dependent in part upon his medical qualifications, his social and economic status and the existence of available diagnostic and therapeutic facilities at his disposal. I have discussed the methods by which these needed factors may be acquired or furnished to the general practitioner. It now remains to discuss his relationship with his fellow-general practitioners, with consultants, internists, general surgeons and the specialists in the narrower fields of medicine and surgery.

I think it will be recognized that the professional relationships of the general practitioner are very important factors in regard to efficiency of service and his economic status. With his fellow-general practitioners his relationship should be one characteristic of justice and fair dealing. This can best be brought about by the organization of the medical profession of a community into a society or association. So organized the medical profession will be able to wield a united influence in the promotion of the welfare of the lay public and for their own mutual benefit. Professional association of this kind promotes friendship, respect and good-will. Frequent meetings for the consideration of professional topics is a means of professional advancement. The organized professional action as a unit may take the initiative in a constructive program, such as that suggested in the establishment of community centres and, furthermore, it lies entirely within the hands of the organized profession to dominate and to control the administration of programs which are put forward to benefit the general public by furnishing the medical profession of the community with facilities which will give opportunities for more efficient medical practice.

The relationship of the general practitioner with the members of the profession who specialize and with the internist and general surgeon is one of the greatest importance to the public and to the general practitioner. On the part of the consultant, general surgeon or specialist this relationship with the general practitioner should be characterized by a broad-minded, sympathetic and helpful attitude. The patient who depends upon the general practitioner for advice and care, who may be referred by him or who may without reference go to individual consultants or to groups of practitioners who are organized for private practice or who compose the staff and faculty of the medical school, should be fairly dealt with in regard to the efficiency of the examination and technical treatment indicated and then should be returned to the general practitioner with written information and advice which will enable him to carry on the future management and treatment of his patient. Every effort should be made by consultants in general to aid the general practitioner in his practice by sympathetic co-operation with him and with the uniform policy characterized by justice and fair dealing. It lies within the province of general and special consultants and of general surgeons to improve the standard of practice of the general practitioner. The errors of practice due to want of knowledge of the general practitioner which may be recognized by the general and special consultants, may be corrected without offense and a little time spent in instruction by the consultants will greatly aid in the avoidance of like errors in practice.

The internist and consultant has an opportunity to greatly improve the methods of diagnosis of the general practitioner. I have already noted that some of the complex methods of laboratory and clinical diagnosis which are of the greatest utility in investigatory work, are unfitted for routine clinical usages. The knowledge obtained of the physical and functional conditions by these complicated methods of diagnosis, often may be reached, approximately by the application of available simpler methods. The internist must be held responsible for the needed simplifications of these methods of diagnosis which he should present to the general practitioner so phrased that he may understand and utilize them in his routine work. In this connection it is to be presumed that the general practitioner will be qualified and will use his brain, special senses and hands in the diagnosis of his patients. His training as a medical student or his post-graduate review training should impress upon him the need of a careful consideration and record of tho history of his patients and this should include a careful setting down of the results of the examination made. He should be able to utilize the simpler laboratory chemical and microscopic tests of the urine, to make an estimate of the hemoglobin, to use the stethoscope with understanding, to apply when required, the much overvalued blood pressure instrument, to apply the simpler tests relating to the condition of the cerebro spinal nervous apparatus and especially to ascertain the presence or absence of the various reflexes and to make careful examination of the abdomen and pelvis. He will never neglect careful examination of the mouth and throat and to carefully note evidences of local, confined infection which may be related to the general condition of the patient.

If in addition to these always available methods of diagnosis, the practitioner may when necessary apply simplified tests of functional conditions, his knowledge of his patient will be greatly improved. For example, the practitioner may recognize that his patient suffers apparently from chronic nephritis as evidenced by albumin and casts in the urine. There may be an associated hyperarterial tension and hypertrophy of the left ventricle, all of which are recognized easily by the qualified general practitioner. These conditions are not sufficient in themselves to enable him to give a definite prognosis which is so important to the patient. If the environment of the physicians and the patient is such that no diagnostic centre is available, or if the patient's financial condition is such that he cannot afford to travel far for the needed accurate tests, the practitioner may utilize simple methods which will give valuable general information concerning the function of the diseased kidney. The kidney is an excretory organ which eliminates from the body water, salts, nitrogenous and other elements. It is a simple matter to ascertain the ability of the kidney to excrete water and the various salts. All that is necessary is that the night urine shall be collected and measured for a period of twelve hours and the specific gravity thereof noted. During a fasting period of two or three hours in the morning, the patient may then be given two quarts of pure water. The urine of this period is separately collected each hour for four or five hours, measured and the specific gravity of each specimen noted. The patient is then given a liberal meal of mixed foods containing meat, and with a considerable amount of common salt as a condiment. For a period of four or five hours after this meal, the urine is collected and measured in hourly periods and the specific gravity noted. A comparison of the amount of urine voided in the three periods will give an indication of the ability of the kidney to excrete water. A comparison of the specific gravity of the urine in the three periods will indicate the ability of the kidney to concentrate and excrete the salts. If polyuria occur during and after the period of excessive water intake and if the urine collected in the afternoon after taking the hearty meal has a high specific gravity, or if the specific gravity of the urine of this period is notably higher than that of the night urine, then the practitioner may assume that the function of the kidney is fairly good. A reverse of these findings in the three observations indicated would signify a relatively bad function of the kidney. This knowledge, while not accurate enough for investigatory purposes, is after all sufficient to serve the practitioner in making a relatively good or a fairly accurate prognosis. In addition, this information may be utilized as a guide in the treatment of the patient.

In 1918 the writer visited the military heart centre at Colchester, England, which was under the direction and supervision of Dr. Thomas Lewis. It was interesting and instructive to witness the operation of this large clinic. Dr. Lewis utilized the simplest measures of diagnosis of the physical and functional condition of the heart in the investigation of the condition of the soldiers who had been sent to the centre for alleged morbid heart conditions. It was especially interesting to find that the man who had done so much in the investigation of heart conditions with the electrocardiograph had no use for this instrument in the routine work of the clinic. The clear and precise explanation of conditions of the heart which are now made understandable by the investigation made with the polygraph and the electrocardiograph may be commanded at a small price in the books written by Sir James MacKenzie, by Dr. Thomas Lewis and others. In addition to this literature, there should be added brief and clearly phrased description of the most striking functional disturbances of the heart and how they may be recognized by the methods of examination always available to the general practitioner.

It is unnecessary to cite other examples of the utility of simplified new methods of physical and functional diagnosis which should be made available to the general practitioner. In this connection the members of the medical profession must recognize that investigatory methods in clinical medicine are necessary in the promotion of scientific accuracy and in the extension of this field of learning. Investigators are born, not made by training. Too often fallacious conclusions have been made by individuals unqualified to make scientific research. This unjustified wastage of time and money should not create a sentiment derogatory of such work; rather should it encourage the few qualified individuals to continue in this fruitful field of endeavor. But these favored few among us should ever bear in mind that all acquired accurate scientific knowledge should when possible be made available for practical routine application by the large majority of us who constitute the rank and file of the profession.

Finally it is necessary to say that the professional and economic status of the general practitioner is mainly dependent upon himself. If he is himself blessed with physical health and average mental capacity, he will find a way and means to keep abreast of medical progress. If he is qualified professionally and if he give conscientious and energetic service to the best of his ability, disregardful for the time being of the degree of the financial reward he may receive, to any patient who consults him, he will not lack for patients and ultimately his financial reward will be satisfactorily large.

Perhaps I have been in error in presenting an essay of this character to this association. Conditions which confront the medical profession of the United States justify discussion of the involved topics. If the medical profession and the Canadian people enjoy a satisfactory condition of health regulation and medical practice which makes this discussion unnecessary, then I most heartily congratulate you and request that you unite in showing us, your cousins and friends, how we, too, may go and do likewise.

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(*) Billings, Frank. The Future of Private Medical Practice, 1921. J.A.M.A., 349-354.

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BASAL METABOLISM AS A GUIDE IN THE SURGICAL TREATMENT OF GOITRE WITH HYPERTHYROIDISM*

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THE confidence of the medical practitioner in the surgical treatment of goitre with hyperthyroidism does not seem to have kept pace with the successes achieved. The fact that in the earlier years there was a rather large percentage of failures has overshadowed the real progress that has been made, and has stood in the way of a just appreciation of what modern surgery can do. While it must be frankly admitted that up to the present time from 25 per cent. to 35 per cent. of cases of Graves' disease and from 10 per cent. to 15 per cent. of cases of toxic adenoma of the thyroid have not been cured by operation, it can, nevertheless, safely be said that so far operation has given incomparably better results than has any other form of treatment.

The medical practitioner should not expect too much of surgery. It is a fallacy to assume that all surgical procedures are curative. The surgery of appendicitis has tended to develop the idea that a surgical operation which yields a result short of a complete cure must be classified as a failure.

In Graves' disease we have to deal with a condition involving many elements, of which thyroid hyperactivity is but one, though the foremost. In other words, Graves' disease is not an intrinsic disease of the thyroid gland, and the extirpation of the thyroid, with consequent suppression of that particular secretion which is responsible for the increased metabolism, does not necessarily ensure a recovery of the physiological balance of the other elements, endocrine and sympathetic, which are admittedly concerned in the development of the complete clinical syndrome. If, therefore, the operation is successful in abolishing the hyperthyroidism, but does not bring complete relief, the failure must be attributed to mal-adjustment of the extrinsic elements, to a permanently deranged sympathetic system, or to the persistence of myocardial changes, all of which conditions antedated surgical treatment.

Toxic adenoma, on the other hand, is, so far as we know, an intrinsic disease of the thyroid gland, with symptoms referable only to its own activities. This assumption is very strongly supported by the rapid disappearance of all symptoms after extirpation of the focus of disturbance. The surgical failures in this group are due, as pointed out in a previous paper, to inadequate or delayed operation or to pre-existing myocarditis.

Physicians look dolefully upon the outcome of cases of Graves' disease, and there are internists who say that they have never seen a complete and permanent recovery. I hope to be able to show from the accompanying histories and metabolic charts that early surgical intervention in Graves' disease is not merely warranted, but indeed yields the most satisfactory results. If operation can be shown to be the best way of treating this disease, why should it not be undertaken early? Time will, I think, show that the surgical failures in Graves' disease are in direct proportion to the time which is allowed to elapse between the onset of symptoms and the operation. An analogy may be cited in the treatment of syphilis, where more prompt and more lasting results are obtained when treatment is begun with the detection of the primary lesion, instead of waiting, as was the practice in pre-salvarsan days, for the appearance of "secondaries." The "secondaries" in Graves' disease are the signs of toxic saturation—loss of weight and strength, pronounced exophthalmos, and myocardial changes.

At the present time the basal metabolic rate is unquestionably the only reliable index of the presence and degree of hyperthyroidism. Two other tests have in recent years been described as of value in the recognition of the state of hyperthyroidism—the epinephrin reaction described by Goetsch and the sugar tolerance test.

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Concerning the epinephrin test, the work of Peabody would seem to demonstrate its lack of specificity at least. The result of his observations may be briefly summarized in the statement, that there exists no relation between the intensity of the reaction to epinephrin and the severity of the hyperthyroidism. Furthermore, the epinephrin test was found to be positive in 14 per cent. of normal individuals; in 48 per cent. of those presenting the "effort syndrome"; in 50 per cent. of convalescents from influenza and pneumonia; in 47 per cent. of cases of questionable or definite tuberculosis: in a still larger percentage of psychoneurotics, and, finally, in individuals in whom the basal metabolic rate varied from minus 1 to minus 18.

With regard to the sugar tolerance test, the most that can be said is that intolerance seems to bear a definite relation to the degree of hyperthyroidism, as determined by the basal metabolic rate. That is not to say, however, that the hyperthyroidism per se is the cause of either diminished tolerance or delayed assimilation. We must remember that, in cases with high metabolic rates, there is rapid tissue waste; and it is reasonable to suppose that in such cases a degree of intolerance may easily be reached where absorption of sugar into the blood takes place not only from the gastro-intestinal tract, but also from the incorporated sugar reserves.

In the following reports the "basal rate" means the basal metabolic rate. All figures represent plus rates or percentages above normal.

The metabolic determinations have been made with the Benedict portable apparatus, under the personal supervision of Dr. Rabinowitch of the General Hospital staff. The uniformity of the results obtained is the best evidence that one can submit of the accuracy of this appartus in the hands of an expert. It is very essential that it be kept in perfect working order and frequently tested out, and that every precaution should be taken against leakages, because the leakages bear entirely upon the oxygen consumed and not upon the carbon dioxide elimination. For this reason a comparatively slight leak may lead to a plus error of from 20 per cent. to 30 per cent. in the estimation of the basal rate.

The routine method of procedure for the primary determination is to take three observations of ten minutes each, at intervals of 15 minutes. The first observation is then discarded as being generally higher than normal, and the rate computed upon the average of the second and third observations. Subsequent rates are determined upon the average of two observations of ten minutes each, with an interval of 15 minutes. These must agree within 1 per cent.; otherwise the test is thrown out and repeated at a later date. It is hardly necessary to say that all observations are made after a 15 hours' fast and after complete muscular rest for from 20 minutes to half an hour.

Although arranged in two groups, the first comprising seven cases of Graves' disease, and the second, five of toxic adenoma, these have not been selected, but represent consecutive studies upon the first twelve patients with hyperthyroidism treated under the control of basal metabolic determinations.

Group I.

Case 1.—Miss B., aged 20, referred by Dr. Lafleur. Graves' type without exophthalmos. The symptoms dated from June, 1920, and were attributed by the patient to a narrow escape from drowning one month previous. The goitre appeared three months after the symptoms, in September, 1920.

The basal metabolic rate, taken January 7, 1921, was found to be plus 34; the pulse, 114. Four days later the rate had risen to 36; the pulse to 116. Because of the patient's excellent physical condition and normal cerebral control, the absence of electro-cardiographic indications of myocarditis, and a basal rate well within the limits of safety, radical operation was considered justifiable, and was performed on January 15. The post-operative reaction was mild. On the following day the patient stated that the precordial thumping had ceased. By the tenth day the tremor of the hands had disappeared. On the 16th day after operation the basal rate was found to have fallen to plus 5, the pulse to 88. The patient was discharged on February 8th. A final metabolic observation made on April 4th showed that the rate was plus 4, the pulse 82. There were no residual symptoms.

In this case, as in all, the patient is to devote at least three months to convalescence before returning to her work.

The outcome of operation would appear to be a prompt and radical cure—a result not to be obtained by any other than surgical means.

Case 2.—Mrs. T., aged 39, referred by Dr. F. S. Swaine. Graves' type with pronounced exophthalmos. The goitre was discovered in September, 1920; the symptoms developed in October, 1920. There was no history of antecedent shock or infection.

The electro-cardiogram was negative. On January 16, 1921, the basal metabolic rate was found to be 76; the pulse, 112. On January 21, after a week's rest in bed, the basal rate showed the usual fall of five points (71), and the pulse had fallen to 96. On February 2nd, after a further rest of nine days in bed, the metabolic rate was found to be the same, although the pulse had risen to 112.

As the basal rate had become stabilized and the maximum benefit from rest secured, ligation of the superior thyroid arteries was done on February 4th under local anaesthesia. This was followed by a moderately severe reaction. On February 21st, sixteen days after operation, the basal rate had fallen to 60, the pulse to 104. On February 27th a further decline in the basal rate was noted, from 60 to 55, but the pulse had increased to 108. On March 6th the rate was again found to be 55, with a decline in the pulse to 96.

As the basal rate had evidently again become stabilized and the patient showed excellent cerebral control, and there had been no further loss of weight, radical operation was considered to be safe. On March 11, 1921, subtotal excision of the thyroid was done. The reaction was moderately severe. On March 15th the basal rate was found to have fallen to 38; the pulse to have risen from 96 to 110. The patient was discharged on March 23rd, to continue her convalescence in the country.

On April 13th the metabolic rate was found to be plus 9, the pulse 84. However, no diminution in the exophthalmos was noted.

On May 11th the patient again returned for examination. The basal rate proved to be plus 1; the pulse, 78. The weight was 112½, a gain of 15 pounds.

In this case, as in Case 1, the precordial thumping disappeared within 24 hours after thyroidectomy. The satisfactory results in both patients are to be ascribed to the comparatively early extirpation of the thyroid and the absence of myocardial changes.

While the pulse rate during the time that the patient was under treatment in hospital conformed in a general way to the basal rate, there was on more than one occasion a rise in the pulse rate while the metabolic rate registered a decline. These variations between the pulse rate and the basal metabolic rate are most commonly met with in Graves' disease, and prove that the basal rate is a more stable index of the degree of thyroid hypersecretion than is the pulse.

Case 3.—Miss O., aged 28, referred by Dr. Pennoyer. Graves' type, without ocular signs. The symptoms dated from June, 1920, and were attributed to shock from the sudden death of the patient's mother three months previously. The goitre was not observed until the patient consulted Dr. Pennoyer in July, 1920, at least one month after the onset of symptoms. The patient gave a history of severe toxic symptoms in July and August, 1920—vomiting, oedema of the legs, and the loss of 15 pounds in weight. Throughout August, September and October, and for the greater part of November, 1920, she had been continuously confined to bed, and underwent three courses of x-ray treatment. No marked improvement, apart from a gain in weight, resulted from either the rest or the x-rays. Latterly the nervousness and palpitation had increased.

On February 12th, after two days' rest in hospital, the basal rate was found to be 42; the pulse, 112. There were no unfavorable features in the physical examination, but the history of oedema suggested the possibility of myocardial changes. The electro-cardiogram showed the presence of left ventricular preponderance. On February 16th the basal rate had risen to 45. This rise, with the patient in bed, suggested that she was entering upon a period of increased hypersecretion, and for this reason operation was delayed. On February 21st, after 11 days' rest in bed, the rate showed a still further rise, to 52, while the pulse remained at 112. This rise in the basal rate was looked upon not only as a confirmation of the supposition that the patient was entering upon a period of exacerbation, but as an indication that a ligation should be done instead of a radical thyroidectomy. This was carried out on February 23rd, under local anaesthesia, and was followed by a moderately severe reaction. On February 27th the basal rate was found to be 34, the pulse 96. On March 5th, ten days after ligation, the basal rate showed a rise of one point, to 35.

On March 14th subtotal thyroidectomy was performed. The operation was rendered much more difficult by the presence of adhesions, the result of x-ray treatment. The reaction was moderately severe. Five days after operation the basal rate had dropped to 30; the pulse to 88. On March 25th, just before discharge, the basal rate was 25, though the pulse had risen from 88 to 100.

On April 22, 1921, the patient reported for examination and metabolic observation. Her general health had markedly improved, so much so that she was disinclined to adhere rigidly to the prescribed rest. The weight was 144, as compared with 136½ on discharge three weeks previously. The basal rate was found to be 16; the pulse, 88.

On May 3rd the patient was again seen. There had been a further gain in weight, with marked improvement in her feeling of well being. The basal rate was found to be plus 9; the pulse, 80.

The case is instructive in showing the value of repeated observations in deciding whether the patient is approaching or receding from a peak of thyroid hypersecretion, and in furnishing a guide to the form of operation which may be safely undertaken.

Case 4.—Mrs. LaB., aged 26, factory hand, referred by Dr. Grant Campbell. Graves' type with ocular signs. The goitre was first noticed in March, 1920, and was followed in November by symptoms of nervousness and palpitation, which were attributed to worry over the loss of her husband two years previously.

This patient was admitted to hospital on January 20, 1921, showing signs of very severe thyroid intoxication—extreme nervous excitability, restlessness, tremor, incoherent speech, lack of cerebral control, deep flushing of the face, and sweating. The electro-cardiogram showed no myocardial changes. The lack of cerebral control was shown by pronounced unreasonableness, the patient getting out of bed as soon as the nurse's back was turned, and removing the ice bags from her neck and chest. Until February 5th, although repeated attempts were made, it was impossible to secure sufficient co-operation on the part of the patient to permit of an accurate estimation of the basal rate. On that date, however, the rate was found to be 96; the pulse, 128. On February 13th the rate was 94; the pulse, 120. On February 21st the rate was still 94; the pulse, 116. The patient was showing better control and could be kept absolutely at rest in bed. On February 28th the rate had fallen to 85, although the pulse showed a rise from 116 to 126. At this juncture it was thought that ligation would be safe, but permission for such an operation was obtained only on condition that the patient should be allowed to go out for 24 hours to arrange some personal affairs. Leave of absence was granted on March 12th. On the following day the patient returned in a very excited state, with oedema of the ankles. She was returned to bed and ice bags were re-applied. At the end of 48 hours the basal rate was taken and found to be 100; the pulse, 122. After a further lapse of eight days, the basal rate was 98, the pulse, 146.

On March 25th ligation of the superior thyroids was done. The patient was extremely apprehensive when she came to the operating room, and, as nitrous oxide failed to induce anaesthesia, a small amount of ether was introduced into the circuit, and the neck injected with novocain. Bipolar ligation was rapidly performed. The reaction from operation was not as severe as had been feared. Within 24 hours a marked improvement in cerebral control was noted, with the disappearance of the congestion of the face. The change in the patient's mental attitude was as obvious to herself as to her attendants.

On April 3rd the rate showed a decline of 26 points, from 98 to 72, and the pulse had dropped from 146 to 122. On May 2nd the basal rate was found to be 42, the pulse 110 There was a marked improvement in all the symptoms, and, whereas before ligation the patient was firmly opposed to surgical interference, she is now willing and anxious that the second operation should be performed.

This case illustrates the fact that preliminary ligation may within a comparatively short time lower the basal metabolism to a point where radical operation may safely be undertaken. In fact, one is inclined to say that, generally speaking, a proportionately greater benefit is to be derived from ligation in cases with high basal metabolic rates than in those in which the toxaemia, as measured by metabolism, is of a mild grade. In other words, in cases of Graves' disease, where the basal rate is persistently below 50, other factors being favorable, one could not hope to secure very marked or lasting benefit from preliminary ligation.

Case 5.—Mr. S., aged 48, referred by Dr. R. W. Adams, Newport Centre, Vt. Graves' type, with beginning exophthalmos. The symptoms dated from mid-September, 1920. The presence of goitre was noted early in January, 1921. The patient had had a severe attack of influenza in May, 1920, and had not been able to work since. There had been a loss of 15 pounds in weight since the onset of the symptoms.

All of the usual signs and symptoms of Graves' disease were well marked, except nervousness, restlessness, and lack of cerebral control. The basal rate, taken on February 27th, was found to be 82; the pulse, 124. On March 4th, after five days' rest in bed and the application of ice bags, the rate had fallen to 70, the pulse to 102. On March 8th bipolar ligation was performed under local anaesthesia. The reaction was slight. Three days later the metabolic observation showed a post-operative rise to 76, without, however, an accompanying acceleration of the pulse rate. On March 17th, nine days after operation, the basal rate had fallen to 61, while the pulse remained at the former level of 100. The patient was discharged on March 18th, with instructions to report at the end of six weeks for further observation.

Although the patient showed severe toxaemia with loss of weight and strength, the complete absence of cerebral instability rendered the prognosis much more favorable.

An interesting feature in this connection was the peculiar susceptibility to emotional influences. If one spoke sympathetically to the patient, he would immediately begin to cry. Otherwise, apart from pronounced tremor of the hands, he exhibited none of the nervous manifestations of Graves' disease.

Case 6.—Mrs. LaS., aged 28, admitted to hospital March 9, 1921. The goitre had been present for two years; the symptoms had developed one year later. Distinct Graves' type, without ocular signs or symptoms of nutritional impairment—a case in which one would expect to meet with a low basal rate, were it not for the rapid pulse and local signs of thyroid hyperactivity, namely, pronounced enlargement, pulsation, thrill, and bruit.

On March 11th, after two days' rest in bed and the application of ice, the basal rate was found to be 75; the pulse, 130. On March 15th, after four days more in bed, the rate had fallen to 52, the pulse to 120. On March 18th ligation of the superior thyroid arteries was performed under local anaesthesia. The operation was followed by little or no reaction. The basal rate showed four days later a decline of 14 points, from 52 to 38, with a fall in the pulse to 106. During the last week of March a distinct increase in the size of the thyroid gland was observed, and increased activity was assumed, although the pulse continued to fall. On April 2nd the basal rate was found to have risen to 58. On April 5th a distinct recession in the size of the thyroid gland was noted, and on April 12th the basal rate was down to 56. The pulse rate had, however, risen to 116. Three days later, because of the marked decrease in the size of the gland, the rate was again taken, and was found to be 48, a fall of eight points. The pulse remained steady at 116.

On April 22nd subtotal thyroidectomy was performed under nitrous-oxide-oxygen anaesthesia. The anaesthetic proved unsatisfactory, inasmuch as it was found impossible to maintain the patient's color, and towards the conclusion of the operation the pulse became very rapid. This, I am convinced, was due to cardiac asphyxiation. During the 24 hours following operation the pulse rate varied between 160 and 180, and its volume was only maintained by rectal and subcutaneous salines. Twenty-two hours after operation the patient's condition appeared to be critical, but was promptly relieved by an intravenous injection of 700 cc. of 10 per cent. Gum Arabic. From this time on convalescence was rapid.

The febrile reaction from operation was but slight, nor was there any marked exacerbation in the nervous phenomena. In fact, it appeared quite evident that the post-operative crisis was due entirely to the anaesthetic. The patient's own statement was that the gas frightened her, and she regretted that she had asked that a general anaesthetic should be used rather than local.

On April 29th, one week after operation, the basal rate had fallen to 12, the pulse to 98. By May 4th the hyperthyroidism had been practically abolished, the basal rate being plus 4 and the pulse 82. At this latter date the tremor, too, had disappeared. The patient presented a most radical change in her appearance, and was enjoying a feeling of well-being which she had not known for months.

This case illustrates very beautifully the close parallelism between the metabolic rate and the pulse rate. This is especially to be looked for in individuals in whom the toxaemia is not severe or of long standing, where there is good cerebral control, and where myocardial changes have not taken place.

Case 7.—Mrs. V., aged 30, referred by Dr. C. F. Wylde. Graves' type without ocular signs. Admitted to hospital March 14th, 1921. The symptoms dated from January, 1920, but the goitre did not appear until September, 1920. There was no history of antecedent nervous shock or infection. There had been no loss of weight or strength.

Three days after admission the basal rate was found to be 32, the pulse 108. On March 21st a subtotal thyroidectomy was performed. The operation was followed by a moderately severe reaction. On March 25th the basal rate was 52, the pulse 120. On April 2nd the rate was found to have fallen to 19, the pulse to 98. On April 10th the readings were 16 and 98, respectively.

This chart also shows the close parallelism between the pulse rate and the metabolic rate. In this case, as in Case 1, one would expect rapid disappearance of the hyperthyroidism on account of the moderate grade of the intoxication and the absence of myocardial changes.

Group II.

Case 8.—Miss M., aged 45. Toxic adenoma. This patient was admitted to hospital on January 17th, 1921, with a history of goitre dating back 16 years; symptoms of hyperthyroidism for the past 10 months; a loss of 12 pounds in weight during the past eight months; and loss of strength, with quadriceps weakness.

X-ray examination showed the presence of a homogeneous shadow in the retrosternal region, reaching to the level of the aortic arch, with a narrowing of the trachea at the upper outlet of the thorax. Apart from palpitation and precordial thumping, there was no evidence of cardiac disease. The basal rate, taken

January 3rd, prior to admission, was found to be 22, the pulse 90.

On January 20th, 1921, subtotal thyroidectomy was performed under local anaesthesia. The patient made an uneventful recovery, and was discharged on January 31st.

On March 13th she reported for observation. The basal rate was found to be plus 5, the pulse 84. She had resumed her duties as office clerk on March 1st. On April 27th she reported a gain in weight of 13 lbs. and stated that she had not felt so well for years.

This is a typical example of the result to be expected from operation in cases of this kind.

Case 9.—Mrs. K., aged 46, referred by Dr. C. A. Peters. Admitted to hospital February 8th, 1921, with a history of symptoms dating from February, 1920, attributed to the sudden and tragic death of her husband in March, 1919. The enlargement of the neck had been noted about a year before the symptoms developed. There had been a loss of 17 pounds in weight during the past year, but no loss of strength. Several long periods of rest in bed during 1920, after the first appearance of the symptoms, had failed to effect any permanent improvement.

The patient was extremely nervous and restless, and utterly lacking in mental control. There was marked tremor of the hands. The average pulse rate was 106. The electro-cardiogram did not show any evidence of myocardial change.

Two days after admission the basal rate was estimated to be 38, the pulse 108.

On February 15th subtotal thyroidectomy was performed under local anaesthesia. The operation was followed by a very severe reaction, which lasted for 72 hours. Subsequently, however, convalescence was uneventful. On February 25th, ten days after operation, the basal rate was plus 1 and the pulse 80.

On April 27th the patient reported a gain of 18 pounds in weight, and on May 4th a further gain of two pounds.

Case 10.—Miss P., aged 52, referred by Dr. Dunstan Gray. Admitted to hospital February 20th, 1921, with a history of goitre of 32 years' standing, and symptoms of hyperthyroidism for the past seven months, during which time there had been a loss of 26 pounds in weight, palpitation, precordial thumping, tremor of the lips and hands, and pronounced nervousness.

The goitre was of the colloid cystic type, with a large calcareous nodule in the right lobe. The x-ray showed marked displacement of the trachea to the right, with compression. The electro-cardiogram showed the presence of slight left ventricular preponderance. On February 27th, two days after admission, the basal rate was found to be 38; the pulse, 80.

On March 3rd, under local anaesthesia, subtotal extirpation of the thyroid was performed. This was followed by a moderately severe reaction, recorded three days later in the basal rate, which showed a rise to 58, the pulse showing a parallel rise to 100. From this time on, however, convalescene was uneventful.

On March 9th, six days after operation, the basal rate was 25, the pulse 76. On March 15th the readings remained the same. The patient was discharged on March 16th. She returned on April 6th, very greatly improved, with a gain in weight and a decline in the basal rate to plus 4.

Case 11.—Mrs. H., aged 48, referred by Dr. G. T. Griffith, with a history of periodic attacks of subacute thyroid intoxication during the preceding five years. The enlargement of the neck was first noticed in December, 1920. There had been a loss of 20 pounds in weight during the past eight months, with tremor of the lips, tongue and hands, and palpitation and nocturnal thumping. The goitre was small and definitely of the nodular type.

On admission, March 11th, the basal rate was 45; the pulse, 108. On March 15th, after four days' rest in bed, the basal rate had risen to 50, but the pulse had fallen to 96. On March 17th subtotal extirpation of the thyroid was performed under local anaesthesia. The reaction was moderately severe. Convalescence was uneventful, and on March 25th the basal rate proved to be 17—a decline of 33 points; the pulse was 90. On April 2nd the basal rate was plus 6; the pulse still 90. On April 10th, the date of discharge, the basal rate was plus 4, and the pulse 86.

Case 12.—Miss W., aged 42, referred by Dr. A. T. Bazin. Admitted to hospital April 2nd, 1921, with a history of goitre of 14 years' standing and symptoms of hyperthyroidism recurring at intervals during the past seven years. During the periods of exacerbation the symptoms referable to the heart had dominated the picture. One month prior to admission, while returning from the Southern States, the patient had had to be removed from the train to the hospital at Covington, because of alarming cardiac symptoms, precipitated by an attack of train sickness.

Examination showed well marked symptoms of hyperthyroidism — nervousness, tremor, rapid pulse, and precordial thumping. The goitre was small but distinctly nodular. The pulse was 120. In addition to hypertrophy and the presence of a basal systolic murmur there was definite evidence of myocardial changes, as shown by the electro-cardiogram.

On April 3rd the basal rate was found to be 39; the pulse, 120. On April 10th, after one week's rest in bed, the basal rate showed a decline to 22. On April 11th subtotal thyroidectomy was performed under local anaesthesia. The post-operative reaction was milder than one would have expected in view of the myocardial changes. On April 21st the basal rate was found to have fallen to plus 4; the pulse to 72. The patient was discharged on April 25th, completely relieved of the distressing cardiac symptoms.

Summary

In the Graves' cases the average age of the patients was 32 years; the average duration of the goitre, eight months; and the average duration of the symptoms, seven months; whereas in the cases of toxic adenoma these figures were, respectively, 46½ years, 12½ years, and 3 years.

In the differentiation of these two conditions the most striking point is the difference in the period elapsing between the appearance of the goitre and the onset of symptoms, which in Graves' disease is, on an average, about three months, and in toxic adenoma from 12 to 18 years.

Of the local manifestations it should be noted that a thyroid bruit was present in all of the cases of Graves' disease, and a palpable thrill in three out of the seven cases, whereas in none of the cases of toxic adenoma was either bruit or thrill noted. Again, in three out of the seven cases of Graves' disease ocular signs were present, whereas they were conspicuous by their absence in all of the cases of toxic adenoma.

The cases of Graves' diseases reported appear to confirm the belief that mental shock and acute infections are causative factors in the development of hyperthyroidism. To cite one instance in each category: In Case 1 the symptoms developed within one month of a narrow escape from drowning, and in Case 5 they dated from an attack of influenza.

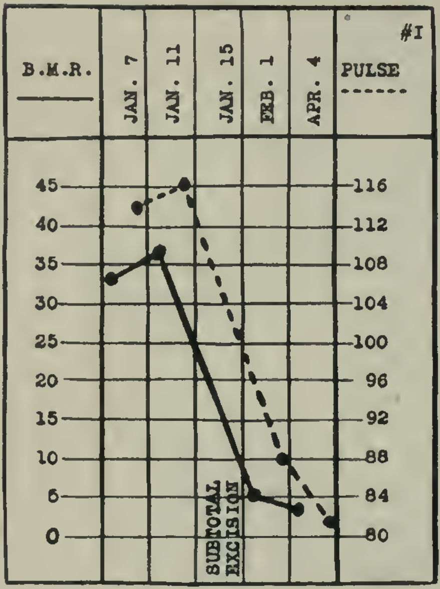
In the history of the illness, the occurrence of oedema of the legs should be accepted as a warning of the possible existence of myocardial changes which may be undetectable by stethoscopic examination. In such cases radical procedures should be undertaken only if the basal metabolic rate is well within the limits of safety, because severe post-operative reactions, especially cardiac manifestations, are the rule.

Such signs as quadriceps weakness, loss of the power of convergence (Moebius' sign), the absence of wrinkling of the forehead when looking upward (Joffroy), and lagging of the upper lid in downward movements of the eye (Graefe), are probably due to one and the same cause, namely, the selective action of the thyroid toxin upon the muscles concerned. This belief was substantiated by the observation made in the case of one patient (seen with Dr. E. Archibald of Montreal), who had been confined to bed for some months, that pressure of the forefinger upon the tibia, with the knee flexed at a right angle, was sufficient, owing to quadriceps weakness, to prevent extension of the leg, whereas in the same patient the pressure of the finger upon the dorsum of the hand, when in plantar flexion, was readily overcome by the action of the extensors of the wrist and hand.

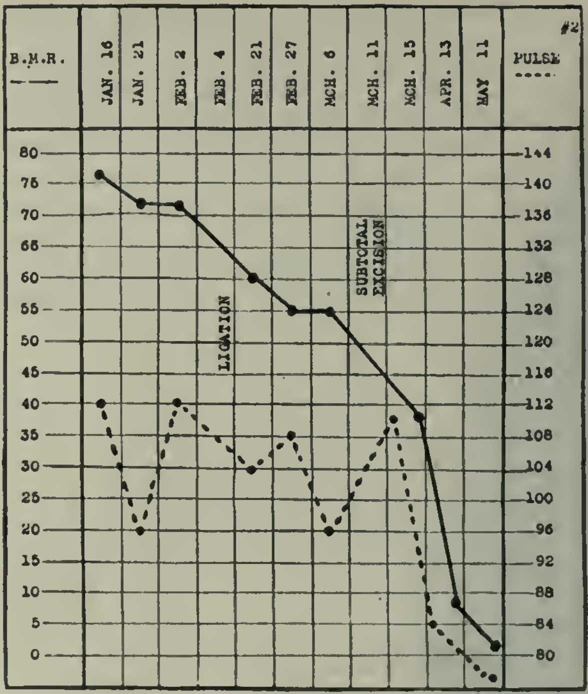
In Case 4, in which Joffroy's sign was most pronounced during the period of excessive intoxication, wrinkling of the forehead reappeared to a slight degree with the fall of the basal rate from 98 to 72, and was fully re-established with a further decline to 42. In Case 5 Graefe's sign, which was pronounced when the basal rate was 82, could only occasionally be demonstrated after ligation and the falling of the rate to 62. In the same way a progressive return of the power of one or both internal recti muscles is noted with the gradual disappearance of the toxaemia.

Stress has been laid upon the basal metabolic rate as an index of the degree of intoxication, as a guide to the time and extent of operation, and as an accurate means of estimating the effect of treatment. It must not, however, be assumed that the basal metabolic rate is the only guide. Familiarity with the patient's general condition is of the utmost importance. The pulse rate in general parallels the basal metabolic rate, and to that extent is a fair guide to the operative risk. When the nervous system bears the brunt of the intoxication, a wide margin must be allowed for post-operative reaction. The existence of long-standing cerebral irritation implies the exhaustion of nerve energy, possibly in many cases the partial disintegration of the nuclei of the cerebral cortical cells, and such subjects are ill-conditioned to stand the shock of operation, however perfect the technique.

The question of anaesthesia would appear to be mainly one of personal choice and experience. In some of the larger clinics nitrous-oxide-oxygen is the anaesthetic of choice; in others, open ether. My own preference is for local analgesia. All of the operations in this series were done under local analgesia, with the exception of the ligation in Case 4, in which gas-ether combined with local infiltration was employed, and the excision in Case 6, which was done under nit-



Case No. 1



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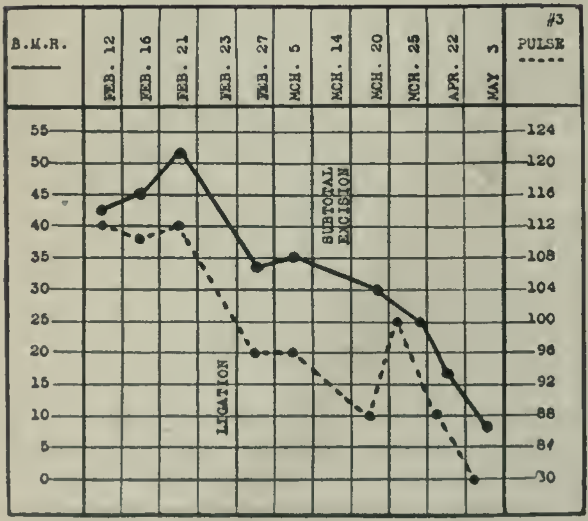

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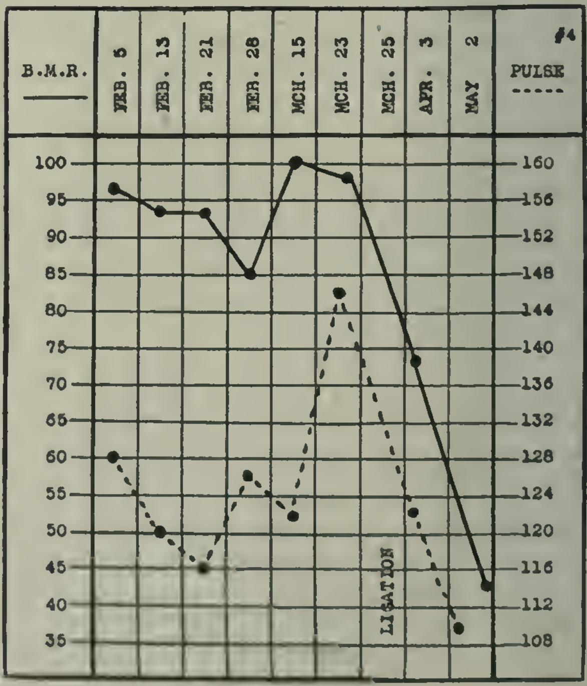

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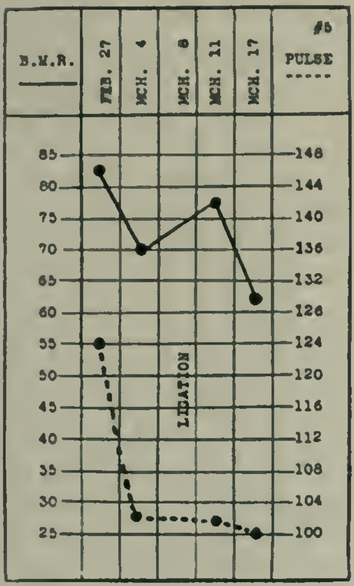

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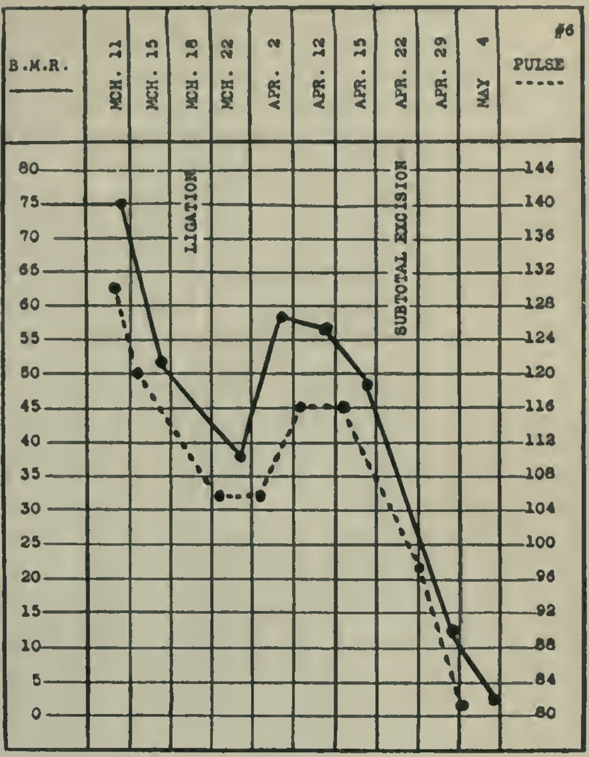

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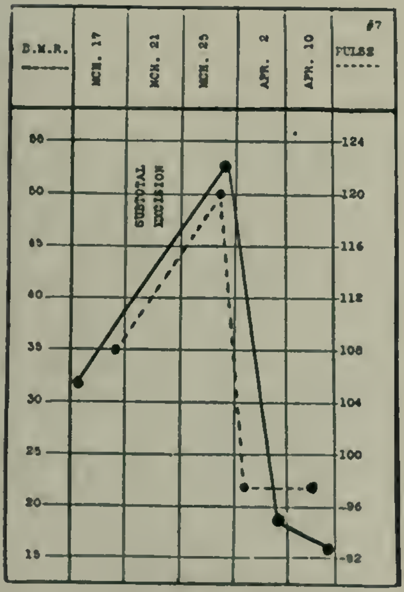

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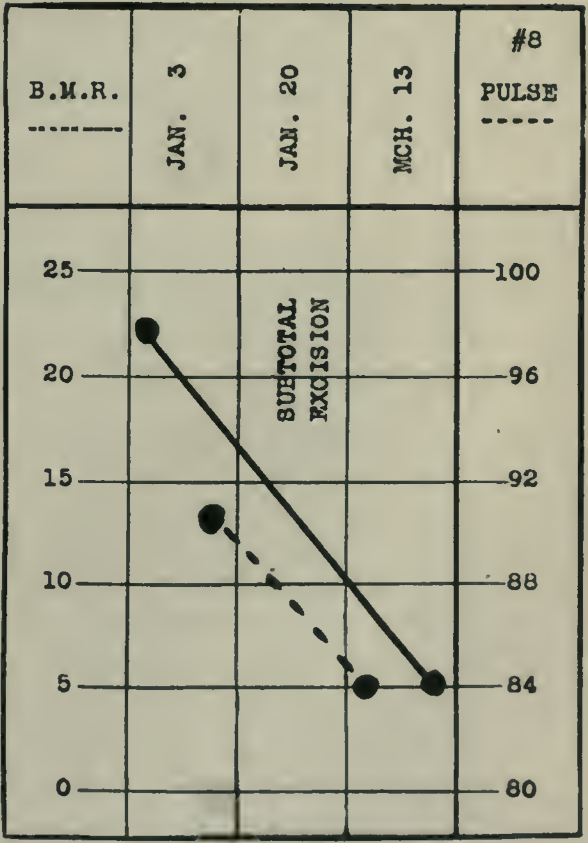

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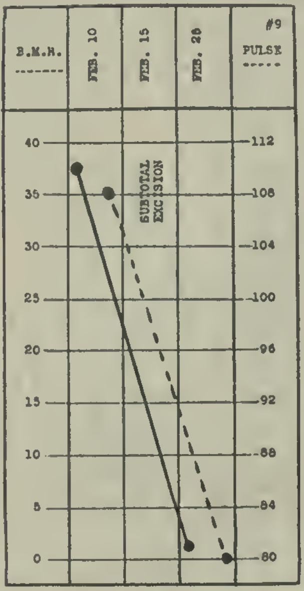

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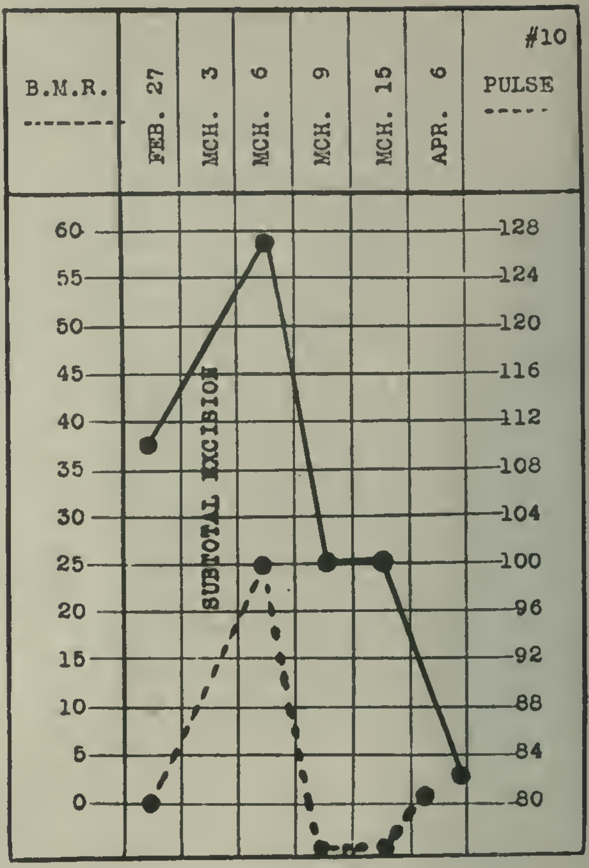

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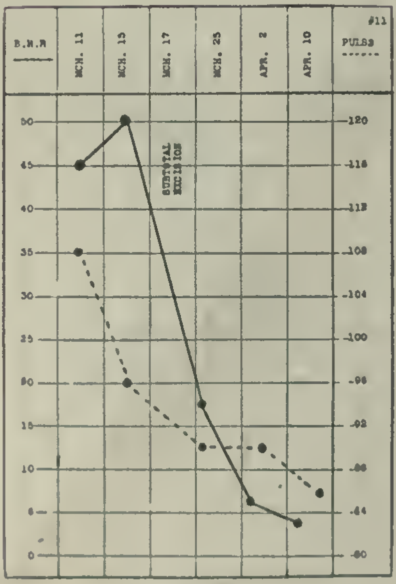

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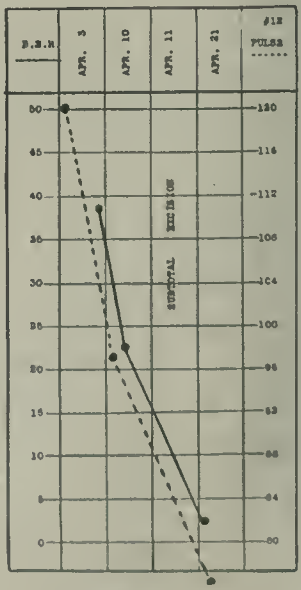

Case No. 12

rous-oxide-oxygen anaesthesia and local infiltration. In the former case, owing to the patient's utter lack of control, the use of local anaesthesia alone was out of the question, and in the latter, as noted in the case report, the use of nitrous-oxide-oxygen proved unsatisfactory. In my experience vomiting is an invariable sequence of operation upon the thyroid, no matter what anaesthetic is used.

In the use of local analgesia the attendance of a nurse capable of engaging the attention of the patient is a tremendous advantage. To meet this need, and to eliminate excitement of the patient by contact with strangers, arrangements have been made in the clinic for the surgical nurse in charge of the thyroid patients to accompany them to the operating room, to minister to their comfort by fanning, applying cold water to the lips, etc., and to maintain their mental tranquillity. This provision is destined to prove a valuable adjuvant in the handling of these cases.

The routine practice after operation is to administer a hypodermic injection of morphine gr. ¼ and atropine gr. 1/150, as soon as the patient complains of pain. This may be repeated every six hours, if necessary. In addition, ice bags, from four to twelve in number, are placed beside the thorax, flanks, and thighs, and rectal salines, 6 oz. every four hours, are given until the patient is able to take by mouth the requisite amount of fluids. Where it is necessary to promote renal action still further, subcutaneous and (in extreme cases) intravenous salines may be administered.

Drainage of the wound is employed in all cases for 24 hours, not only to provide for the evacuation of blood, but also to liberate thyroid juices which might otherwise be absorbed. Dressings should be done daily, to forestall the possible collection of serum, and a director should be passed if there be any bulging or fluctuation at the point of drainage. The stitches are removed on the second or third day.

Early in the convalescence a bitter tonic is given before food, and, where the indications exist, an iron tonic after food.

One would again call attention to the rapid decline in the thyroid hypersecretion after subtotal thyroidectomy. This prompt elimination of the chief factor in Graves' disease will undoubtedly lead to a permanent cure, if operation be performed before toxic saturation is reached, with its consequent excitation of other glandular secretions and the derangement of the sympathetic system—factors which, with our present knowledge, can not be brought into subjection as can the secretion of the thyroid gland, and which are responsible for the perpetuation of symptoms which can not be ascribed to hyperthyroidism.

In conclusion I would like to express my thanks to the different members of the Attending and Resident Staff, to whose close co-operation are due the uniformly favorable results which have been achieved.

Roentgen Ray and Tuberculosis in Infants and Children

As a result of a statistical study of forty-four infants and children at the Boston Consumptives' Hospital, Frederick W. O'Brien and Forrest B. Ames, Boston (Journal A. M. A., May 28, 1921) found that: 1. (a) The von Pirquet and intracutaneous skin reactions are reliable guides to infection with tubercle bacilli, and the number of positive reactions increase from infancy up through childhood, over 10 years of age, all patients reacting. (b) In twenty-six of thirty-six positive skin reactions, the roentgen ray disclosed the site of infection to be intrathoracic.

2. D'Espine's signs as a clinical index of tuberculosis of the bronchial lymph nodes is of relatively little value, being elicited only eleven times, as against roentgen-ray evidence of glandular enlargement in twenty-eight cases.

3. Three cases of positive sputum were found in fourteen diagnoses of chronic pulmonary tuberculosis.

4. Fourteen cases of chronic pulmonary tuberculosis of the adult type were found. This suggests that the so-called phthisis is more common in children than has been stated by writers of text books.

5. Fifteen cases, negative clinically, showed definite roentgen-ray signs of marked structural changes consistent with tuberculous infection. This raises the question as to whether these children are to be regarded as more likely to develop clinical tuberculosis and should thus be watched carefully and roentgenographed at fairly frequent intervals.

FUNCTION OF AN INFECTIOUS DISEASE HOSPITAL

D. L. Richardson, M.D.

Providence, R.I.

It is not customary for scientific men to become eloquent upon matters which concern their own field of endeavor. The public becomes acquainted with their achievements by the slow process of education. But it does seem a pity that more advertising methods cannot be used in education upon the subject of sickness and death. Nothing is dearer to any human being than good health and the reasonable assurance of the three score years and ten. Surely the public wishes to know of the prevalence of disease and death and are willing to expend unlimited amounts of money on measures which experience has proved to be of service in saving lives. If during the year 1918, 490,000 men and women had died in the United States in the service of their country, orators would have loosened their silvery tongues, and the press would have devoted large space to their lives and deeds. But no, they only sickened and died of the most common infectious diseases. If, in the year 1919, 21,000 Canadians had fallen on the battlefield, your countrymen would have know it even in the most remote hamlet; but no, they only perished from these same diseases. Both war and infectious diseases are theoretically preventable, and while in actual practice both are difficult to control, every possible means should be utilized to bring to the lowest point the loss of life from these causes.

In Canada during the year 1919, according to the Registrar-General at Ottawa, 20,921 persons died of the most common of the infectious diseases. The number of deaths from each disease is found in the first column of the table which follows, and this table also includes a column which shows the probable prevalence of each disease enumerated:

	Deaths	Probable case fatality	Estimated number of cases
Influenza	15,590		
Pneumonia	2,382	2%	903,100
Broncho-pneumonia	91		
Scarlet fever	325	3%	10,833
Diphtheria	1,280	8%	16,000
Whooping cough	691	5%	13,820
Measles	431	1.5%	28,733
Chicken pox	3		26,080
Smallpox	34		no estimate
Erysipelas	88	4%	2,200
Mumps	6		32,080
Total	20,921		1,032,846

Population—3,584,000

No estimate of the prevalence of smallpox has been made for lack of data. However, in Toronto alone there were 1,864 cases, with no deaths, during 1919.

The following table sets forth the number of deaths from the same diseases in the Registration Area of the United States, which area includes 77.8 per cent. of the continental population:

	Deaths	Probable case fatality	Estimated number of cases
Measles	8,806	1.5%	587,000
Erysipelas	2,579	4%	64,500
Scarlet fever	2,480	3%	82,600
Smallpox	339		70,000
Influenza	244,681		
Pneumonia	232,786	2%	23,873.350
Whooping cough	13,728	5%	274,560
Diphtheria	11,288	8%	141,000
Typhoid fever	10,210	7%	146.000
Rubella	191		50,000
Mumps	160		391,000
Chicken pox	113		326.000
Total	490,275		26,006,010

For both countries the number of deaths ascribed to each disease is fairly accurate, but the number of cases is estimated only. Statistics of a Health Department of reported cases are, of course, very inaccurate. The estimate of the number of persons ill with each disease is made from fatality percentages which are also presented. These percentages have been arrived at with some care, for the most part from intensive investigations at various places of each of the diseases mentioned. The estimate of the prevalence of mumps and chicken pox have been made from a careful study of

8,000 children, made by Hill in London, Ontario, which had for its object the determination of the number of diseases which children may be expected to have in a single year. It seems unbelievable that in the United States in the year 1918, 26,006,010 people were made ill by these diseases and that of this number over 490,000 died. The total number of deaths in the United States Registration Area for that year was 1,471,367, so that the number of deaths due to the diseases mentioned is about one-third of the total.

To be sure 1918 was an influenza year, but even when we subtract all deaths and cases due to influenza and pneumonia, all forms, there are about 50,000 deaths referable to the other diseases mentioned and much over two million cases. Normally there are about 15,000 deaths ascribed to influenza and about 150,000 to pneumonia. The number of deaths and estimated number of cases in Canada being for the year 1919 are not materially affected by influenza epidemic and probably are a fair average for each year. I am quite sure that the statistics presented are conservative and probably the number of cases are considerably underestimated.

Here is a problem for solution, and the only class of people capable of solving it rationally are physicians. In the past doctors have been too provincial and jealous to become vitally interested in public health, but if they do not rise to the occasion other persons interested in the saving of life and illness will take the leadership. Such leadership, while it may be honestly meant, necessarily will be misdirected, and, in reality, any poor results will reflect back upon the physicians. I doubt whether there has ever been such an opportune time to plan a campaign against infectious diseases or the launching of any other health project. The reading public have learned during the world war what physicians are capable of doing for humanity. This new knowledge should allay any fear which people may have had, that if doctors take the lead in the rational expenditure of money upon public health, they do it for mercenary motives. Anyone with a grain of common sense will realize that if measures of preventing death and illness from infectious diseases succeed, they are turning thousands of physicians out of the prospect of a livlihood. The Canadian people are to be congratulated that their legislators have established a Dominion Department of Health, a move which has for a long time been talked of in the United States. Having taken this responsibility, the Government should select for responsible heads men who have had training and experience. You will then be protected against inefficient legislation and regulations. It will take time to obtain the full co-operation of the Provinces and so will the completion of the organization.

In planning health organization to combat infectious diseases it is necessary to have funds, and these should not be niggardly in amount. It is truly a government function and it should be financed by the government, local and national. Success will depend more upon the leaders and organizers than upon any other factor. They need to have a free hand and should be backed up so long as they are efficient. No politics should be allowed in the selection of personnel of the organization or in its administration. The officers should be selected on their merit because of training, experience and ability. Nothing is so fatal to a governmental organization as political dictation and interference, and surely in so important a department, which deals only with the prevention of illness and saving of lives, the public would wish it freedom of action.

In studying the organization there are a few essential features to be considered. One is the education and co-operation of all physicians. A Health Department may have ever so many inspectors, but it is the family physician who first sees the patient. The inspector responds to his call, and helps him in his diagnosis and sees to it that proper regulations are observed. He should, however, in a tactful way follow leads which may be discovered as to the source of any infection, and follow up susceptible contacts exposed to the discovered cases. Physicians conceal cases not infrequently for fear the patient may be sent to the hospital and thus suffer financial loss. Or more often the family begs the doctor not to report so that they will not be disturbed in their life routine and that they may avoid publicity. In other words, such persons do not care what happens to their neighbors and friends. Misery likes company. It is highly important that the public be educated out of this pernicious habit, and to the good habit of calling in a physician early in every acute illness. When a man has a large family of children and his income is small, to do so is impossible, or only done by a great sacrifice. The Health Department should have one or more physicians who are paid to respond to calls from families of this kind, who will either treat them or send them to the hospital. Success can only be attained by hearty co-operation of the Health Department, the government, practicing physicians and the public. We are handicapped very greatly by our lack of knowledge about infectious diseases. We do not know the cause of a great many of the most common ones. Because of this deficiency in our knowledge we can only recognize the more or less typical cases of any disease, as, for instance, scarlet fever. The number of unrecognized cases of this disease is very large and may even equal those which are recognizable. Then, too, we cannot tell when a patient is free from infection. Again taking the example of scarlet fever, patients are isolated an arbitrary time, from 4 to 6 weeks, providing they have no nasal or aural discharges, and yet 3 to 5 per cent. of them are infectious. The carriers of this disease are just as numerous as are diphtheria carriers. In fact, these two diseases resemble each other very much in many epidemiological aspects.

For many diseases little is known of how they are transmitted under natural conditions and what measures are likely to be of avail. It would be a happy solution if satisfactory immunization methods against all diseases were known. And yet there would remain the great practical problem to get everyone to consent to it. Smallpox vaccination is a good example. This is a preventable disease and has been for 125 years, and yet it is a very common disease in Canada and United States, to our disgrace. But neither our lack of exact knowledge nor the opposition of the public, should deter from putting into practice all the knowledge which we have and the employment of all practicable methods of applying that knowledge. It is highly important that specific measures against all diseases be introduced. In the minds of the public infectious diseases are much alike and methods of prevention are much the same, to wit, the formaldehyde candle, etc. The rules and regulations applying to each disease should be based upon positive scientific knowledge as to its causative agent, the secretions and excretions which are infectious, how early and how late in the disease sick persons are infectious, what becomes of the virus after leaving the body and by what route or routes it enters the body under natural conditions. .

There is only one phase of the infectious disease problem which I wish to discuss in any detail, namely, isolation. It cannot be denied that by keeping well persons from contact with persons sick with infectious diseases is logical. yet isolation is not always possible or practicable. Unfortunately we are able to discover and recognize only a certain percentage of cases. These diseases do not conform always to the text book picture. And just here I wish to state that text books on infectious diseases are very misleading, leaving the student under the impression that all cases can be diagnosed. More space should be given to a typical form of acute disease and they should clearly teach that many cases go unrecognized. These missed cases then cannot be isolated. For such a disease as diptheria it is not practicable to isolate all carriers. And for a disease like scarlet fever we have no means of recognizing them. It is obvious that isolation has its limitations. In several English cities for forty to fifty years scarlet fever and diphtheria patients have been hospitalized and for many years as much as 90 per cent. of patients have been treated in isolation hospitals, yet scarlet fever is as frequent as ever and diphtheria relatively more common. Yet isolation should not be condemned. Its greatest value is seen in the results of isolating the early cases in a threatened epidemic which may thus be cut short. Once an epidemic is under way isolation accomplishes very little. Its value is less evident in such endemic diseases as scarlet fever and diphtheria, although it surely does have a steadying effect upon their prevalence. Certainly we do not see so frequently the periodic outbreaks of these diseases that were formerly experienced.

To accomplish the purpose intended, isolation should be as liberally applied as possible so that the public will co-operate and not attempt to conceal cases. The wage earners should not be disturbed unless necessary and the liberty of the other members of the family should be as unrestricted as can be safely allowed. Isolation should be rationally applied as indicated for each disease. Although it is not practicable to isolate all carriers certainly isolation should be applied to all persons who because of their occupation might be a menace to a large number of persons. Carriers and all suspicious cases among inmates of institutions, particularly where children are cared for, should be isolated.

Where shall the person be isolated? In England and in some American cities authorities have tried to send nearly all cases to the hospital. In London hospitals were opened for patients with scarlet fever in 1870. By the year 1890, 42.8 per cent. were treated in the Asylums Board Hospitals, and this percentage rose until in 1912, 90.6 per cent. were so treated. Yet, while the attack rate in 1891 was 270 per 100,000, in 1910 it was 230. During the interim it was variable, but higher than either of these rates, reaching 860 in 1893, and in 1897, 570. Diphtheria was first hospitalized in 1888. In 1890 the percentage of the hospital admissions was 17; in 1912 it was 86.4. Yet, though the attack rate in 1891 was 150, in 1910 it was 120, and during the intervening period considerably higher.

In Edinburgh 40 per cent. of the scarlet fever patients were admitted to hospitals in

1890, and this rose to 94 per cent. in 1910. In 1891 the attack rate was 604; in 1891, 380, and in 1910, 470. Thirty per cent. of the diphtheria patients in this city were hospitalized in 1890, and in 1910, 93 per cent. In 1881 the attack rate was 80; in 1891, 79, and in 1910, 159. In Huddersfield in 1881, 57 per cent. of the scarlet fever patients were admitted to hospitals; in 1910, 96 per cent. In 1881 the attack rate was 250, while in 1910 it was 870. The intervening years show considerable variations between these two rates. In Leicester in 1880, 28 per cent. of the scarlet fever patients were hospitalized; in 1910, 72 per cent. In 1880 the attack rate was 660, and in 1910, 450. Between these dates there were remarkable rises and falls. In 1885 the rate reached 1334; in 1893, 1254, and in 1906, 1050.

While the incidence of scarlet fever and diphtheria in England has not decreased very much during this period of intensive hospitalization the mortality has lessened very considerably. During the five years subsequent to 1875 the mortality of scarlet fever in the Metropolitan Asylums Board Hospitals was 13.5 per cent.; in 1913 it was 1.2 per cent. In 1888, when the first hospitals for diphtheria were opened the mortality was 59.3; in 1913 it was 6.2. It is fair to assume that extensive hospital treatment during this period in some way has been a factor. Granting that contagious diseases vary in severity at different periods, this consistent and gradual decrease in fatality cannot be wholly explained in this way. It has been suggested by Chapin that hospital isolation of the severe cases leaves the milder forms outside the hospital to propagate disease, thus leading to lessened severity as a whole. In the case of diphtheria the introduction of cultures and antitoxin has had a marked effect upon fatality, and it will be readily admitted that, treatment of this disease in a good hospital is more efficient than at home.

The infectious disease hospital should fulfil three important functions, namely, to save life by affording better treatment than the average home provides, to diminish or control infectious diseases, and for the convenience of the public. It should not be expected that any city build to accommodate all cases in an epidemic. In fact, epidemics of more than one disease may be simultaneous. The hospitals should be large enough, with some margin, to take all cases necessary that occur during an average year. When epidemics occur admissions should be confined to those patients who are sickest or most need hospital care. It is safer for the family in which there is infectious disease to have the primary case removed to the hospital. Few statistics have been published to support this well recognized fact. Chapin, in his 1913 report, shows that among 13,082 persons exposed to 3,078 primary cases of diphtheria which were treated at home, 798 secondary cases of diphtheria developed at home, a rate of 6.10. In his 1911 report a table shows that among 6,176 persons left at home after the removal to the hospital of the primary cases, 150 secondary cases developed an attack rate of 2.4, or almost one-third the rate among those exposed when the primary cases were treated at home. In his 1919 report he shows that among 10,387 persons exposed to 2,063 primary cases of scarlet fever who were treated at home, 827 secondary cases developed an attack rate of 9.9. In his 1911 report he shows that among 3,410 persons left at home after removal to the hospital of the primary cases of scarlet fever developed an attack rate of 2.4, or about one-fifth the rate when the primary cases were treated at home. Each case must be decided on its merits. Cases found in large families, in boarding houses, rooming houses, hotels, institutions, etc., certainly should go to the hospital. Many persons will prefer to send their children to the hospital because it is cheaper or because home isolation is burdensome. Persons will also go many times because they believe they will get better treatment. Where, however, the number in the family is limited, the people are able to furnish proper treatment and can be expected to carry out home isolation, there is no good reason for sending them to the hospital. Hospitals in the large cities of the United States isolate anywhere from 25 to 50 per cent. of the cases of scarlet fever and diphtheria. The isolation hospital is a very important institution, and no city should be without one. It should be a good hospital, and not a pest house. It should be well built and equipped and staffed by persons who know how to treat infectious diseases and how to prevent cross infections.

We have arrived at a stage where the belief in air borne infection is given little weight. It was a few pediatricians in France who between 1885-1890 first pointed out the frequency of pneumonia transfer among measles patients treated in hospitals, and first tried out isolating them in small groups, the pneumonias by themselves, and observing strict cleanliness, doctors and nurses scrubbing their hands and by sterilization of utensils. Between 1890-1900 Grancher, of the Hospital for Sick Children in Paris, isolated scarlet fever, diphtheria and measles in the open ward with patients sick with general diseases. He put a wire screen about the bed, inside of which enclosure were put the patients' utensils. Everything was sterilized which came out of this enclosure and doctors and nurses washed their hands. There were a few cross infections, but so few that it was evident that air-borne infection could play no important role or there would have been hundreds. The Pasteur Hospital built in 1900 was constructed so as to be able to put patients in one bedroom, or in rooms for no more than three patients. Lavatories were supplied to each room, and sterilizers for utensils on each ward. It was the first hospital to be built in which isolation was carried out strictly on the contact theory. Strict surgical cleanliness was practiced so that nothing coming in contact with a patient suffering from one disease would come in contact with patients suffering from other diseases without sterilization. This hospital has accepted for treatment all kinds of infectious diseases, including smallpox. The cross infection rate has been a fraction of one per cent.

Medical ásepsis has also been tried in England and is being used in many hospitals. They find it safe for all diseases, except measles and chicken pox. Rundle of Liverpool and others feel that these diseases should not be excepted.

In 1910 the Providence City Hospital was completed for the treatment of contagious diseases. It was constructed and equipped to carry out medical asepsis or aseptic nursing. During the last eleven years all kinds of infectious diseases have been admitted and a very great many patients have been sent in for observation or diagnosis. I present here a table showing the number of cases of each disease admitted. These statistics do not include cases of pulmonary tuberculosis, which since 1912 have been treated in a separate building. For two years previously these patients were treated in the second storey of the diphtheria building. There has never been a cross infection among these tuberculosis patients.

Patients suffering from all other disease to the number of 13,176 are as follows:

Chicken pox	140
Diphtheria	3,481
Erysipelas	100
Gonorrhoea	210
Influenza	557
Measles	1,132
Meningitis	68
Mumps	66
No disease	185
Other diseases	3,270
Pneumonia	44
Poliomyelitis	87
Rubella	151
Scarlet fever	2,744
Tonsillitis	482
Tuberculosis (children)	31
Typhoid fever	9
Typhus fever	4
Variola	32
Whooping cough	383
Total	13,176

Actually there have been more diseases than are represented in this table, since some patients had more than one disease.

A very careful record of the cross infection rate has been kept and each case has been discussed in the several annual reports of the hospital. Below is the cross infection rates indicated by years as follows:

1910	2%
1911	2%
1912	6.3%
1913	1.7%
1914	1%
1915	4.6%
1916	1.8%
1917	.8%
1918	1.9%
1919	.5%
1920	1.4%

Actually measles and chicken pox have accounted for about two-thirds of these diseases contracted. It will be noted that the rates in 1912 and 1915 were high. These were years when the hospital was crowded and conditions obtained which should never be allowed beyond a certain point. It is then that trouble arises. It is far better to leave some patients at home, selecting those who most need hospital treatment. Overcrowding should never be allowed. And yet, in certain English hospitals which have kept reliable data in the past the rate has been about 7 per cent. in wards or buildings where only one kind of disease has been admitted. I venture to say that the cross infection rates represented compare favorably with those of general hospitals for children.

The Providence City Hospital has six wards for patients. One is devoted to scarlet fever and one to diphtheria. Into the other wards are admitted all kinds of diseases, cases for observation and overflow scarlet fever and diphtheria patients. In fact, we treat in the scarlet fever and diphtheria wards other diseases at times, but for obvious reasons it is best to segregate diseases in separate wards, providing there are enough to keep a ward busy for each. If these results are accepted as practical it opens a wider field of usefulness for the contagious hospital. Instead of treating scarlet fever and diphtheria only, all kinds of acute infectious diseases can be treated in the same hospital, consisting of even a single ward. It renders it possible financially for small cities and towns to build hospitals and be reasonably assured that there will be patients enough to keep a ward open all the time. I venture to suggest that into contagious hospitals will be sent even pneumonia and other acute diseases now treated in wards of general hospitals. It is logical for the nursing of acute infectious diseases in the same ward where heart and kidney and other such diseases are treated does not lead to the best results. The wards are usually not properly equipped and not properly conducted. If all acute diseases are not to be treated in such a hospital, general hospitals should set aside wards for their treatment. In fact, there is no reason why on the grounds and under the same management of a general hospital, an infectious disease hospital should not be located. It is absolutely essential, however, that such a contagious hospital should be presided over by one man who has had experience in the diagnosis of infectious diseases and know, both how they are transmitted and how to prevent it under hospital conditions. The hospital should be divided into small units so that no room should contain more than four to six beds, and 50 per cent. of its patients should be accommodated in rooms for one or two. The equipment is highly important. Aseptic nursing should only be attempted when there is a special lavatory in each room so that hands can be washed in running warm water. There must also be a sterilizer for disinfecting all utensils. The nursing staff, on which the success of the technique will most depend, must be trained in the details of medical asepsis and the superintendent should have had some previous experience. It is teamwork which makes success possible, just as it does in the operating.

In closing I want to point out what such a versatile infectious disease hospital, apart from saving life and infection, would mean to any country. In United States during the war the army authorities were unable to discover many physicians and nurses who were qualified to care for infectious diseases. Few contagious disease hospitals have trained internes and very few have given courses of training to nurses. Hospital and medical school boards have not encouraged it for fear students might become infected and die. The time has come when doctors and nurses should be trained in contagious hospitals and these hospitals will multiply in time to a point where this training will be available to nearly all.

Such a hospital would furnish constant and varied material for research. Research laboratories should be right on the grounds, for too many are located at a distance from the material needed for investigation. There is so much yet to be learned.

I believe we may look forward to the development of this type of hospital, as a place where the acute ill can be adequately cared for, where they can be isolated from others, where doctors and nurses can be trained and where research workers will have abundant material for furthering our scientific knowledge.

Cost of Medical Education and Tuition Fees

The statement is being made that the cost of obtaining a medical education has so increased in recent years as to make it prohibitive except for the well-to-do. The facts do not warrant this statement. It is true that the cost of furnishing a medical education has greatly increased, but this has affected tuition fees to only a moderate extent. Fifteen or twenty years ago the majority of medical schools were meeting their expenses from students' fees; now it is considered quite impossible for a medical school to teach modern medicine unless, in addition to students' fees, it has a generous income either from state appropriations or from private endowment. The actual expenditures for the teaching of medical students by eighty-two medical colleges during 1913-1914 gave an average of $419 a year for each student, as compared with an average of $150 a year for each student paid in tuition fees. On the average, therefore, the expenditure was nearly three times what the student paid in fees. The tuition fee which each student paid in some medical schools was only one-tenth or even less of the money expended for his instruction. The highest fee now is $350 a year; in 1914 it was $250. At the same time, greater provision has been made for deserving but needy students than previously in that more than 300 free scholarships and generous loan funds have been established in about forty of our better medical schools. Aside from the higher living expenses, the cost to the student for obtaining a medical education is only slightly higher than it was fifteen years ago.—Jour. A. M. A., July 23, 1921.

THE DETECTION OF LAMBLIA (GIARDIA) INTESTINALIS BY MEANS OF THE DUODENAL TUBE*

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THE bacterial flora of the intestine, its numbers and composition, are known to everyone. Most of these bacteria are harmless, a number are potentially dangerous, a few must, when present, always be regarded as pathogenic. The allied fact that there is a corresponding animal fauna of the intestine, some of the members of which are harmless, some pathogenic, and yet others of doubtful character is not yet sufficiently recognized. As there is a normal bacterial flora of the human intestine, so there is a normal protozoal fauna, and the majority of both may be regarded as harmless.

The examination of the intestinal contents of the troops quartered in tropical countries during the war, an examination primarily intended to determine the presence of pathogenic intestinal protozoa such as the Entamoeba histolytica, revealed the interesting fact that in a startlingly large proportion of cases the faeces contained various kinds of protozoa, often in great numbers. This led to an investigation of the civilian population in the home lands, and it is now well established that protozoal infections are of much greater frequency than has hitherto been suspected. In using the word "infections," however, I wish rather to signify the presence of animal parasites than to pronounce judgment on their pathogenic properties. Whether some of these animal parasites are or are not pathogenic is a vexed question at the present moment. Indeed the very use of the term parasite may be misleading, for it is by no means certain that some of the denizens of the bowel are anything more than mere harmless commensals.

There are three common protozoal parasites found in man. These are the Entamoeba coli, the Entamoeba histolytica, and the Lamblia (Giardia) intestinalis. The frequency with which these occur in the faeces varies in the reports of different workers in different parts of the world. Wenyon and O'Connor, whose investigations are amongst the most valuable on the subject, found that amongst the healthy British troops in Egypt the Entamoeba coli was present in 20 per cent., the Entamoeba histolytica in 5.3 per cent., and the Lamblia intestinalis in 6.8 per cent.

It may be objected that the subjects of these investigations were living in a tropical country where there was every facility for becoming infected with animal parasites. Surveying, however, all the recent work done in the United States, England, and France, Hegner and Payne obtained even higher figures, as follows: E. coli, 20 per cent., E. histolytica, 9 per cent., and Lamblia intestinalis, 9 per cent. In this communication we are especially concerned with Lamblia infections, and it may be noted that Sanford in a series of 6,000 cases examined routinely at the Mayo Clinic, Rochester, Minn., found Lamblia in the stools in 1 per cent.

A recent paper by Maxcy emphasizes the important fact that Lamblia infections are very much more common in children than in adults. In a series of 89 cases he found that one of every five children over one year of age harboured Lamblia. It is more than probable that the infection is spread from child to child in much the same manner as in the case of Oxyuris vermicularis.

Of the three common protozoal parasites E. coli and E. histolytica inhabit the large intestine, while Lamblia intestinalis is found in the duodenum. The means of detection of these parasites is by examination of the faeces. The object of this paper is to suggest a simpler and probably more certain method of finding the Lamblia, by the use, namely, of the duodenal tube. For this purpose the notes of a case recently under observation in the Winnipeg General Hospital are here given. For the use of these notes I am indebted to Dr. Fred Young.

Case.—A man, 28 years of age, born in South Russia, but resident for eight years in Canada, was admitted to the General Hospital suffering from a febrile condition which proved to be typhoid fever. Rose spots were well marked, but there was no enlargement of the spleen nor any diarrhoea. The Widal test was positive, and typhoid bacilli were recovered from the stools. The disease ran a usual course, and the patient was ready to be discharged from the hospital. In order to determine whether or not he was a carrier Dr. Young passed the duodenal tube, and by means of Lyon's magnesium sulphate method obtained the contents of the gall bladder and duodenum.

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The bile was clear and appeared perfectly normal. A culture was made, and the centrifuged deposit was examined under the low power. The picture which met one's eye was remarkable in the extreme. The microscopic field was swarming with animalcules in the highest state of animation, some dodging this way and that, others spinning round in mad gyrations, now and then pausing to rest. Stained slides showed the presence of a typical flagellate protozoon, Lamblia intertinalis. No fragments of any kind were observed. A pure culture of typhoid bacillus was obtained from the bile.

On the following day the duodenal tube was again passed, but the microscopic picture was a very different one. In place of the swarms of motile lamblia there were numerous fragments of varying size and shape, with here and there a motionless lamblia. Not a single living one could be discovered. What is the explanation of this dramatic change, and what do the fragments represent? It appeared to us that the magnesium sulphate solution, through virtue of its osmotic power, had blown the lamblia to pieces, and that the fragments represented all that remained. On some of the fragments an indication of the saucer-like sucker of the lamblia could be made out.

The patient left the hospital on the following day for a remote part of the province, so that no further investigations could be made. A month later, during my absence from the city, he returned for one day. On examination of the bile no lamblia were found, but typhoid bacilli were still present.

It is not suggested that the lamblia were present in the gall bladder. They were merely recovered from the duodenum together with the bile from the gall bladder.

The usual method of diagnosing lamblia infection is by examination of the stools. The parasites may be found in two forms; the encysted, which is the common variety, and much more rarely the motile. Unless the stools be examined within a few hours of being passed the motile forms die and disintegrate. The cysts, being so very much smaller than those of the metazoa, are apt to be missed under the usual low power examination. By means of the duodenal tube, however, an abundant supply of actively motile parasites can be obtained, which can be recognized at a glance even by those not familiar with such examinations.

In this case the question naturally arose as to the relation of the lamblia infection to the disease from which the patient was suffering, and this opens the wider question of the pathogenic possibilities of lamblia infection, of whether, that is, it is justifiable to speak of such a condition as lambliasis. The views expressed in the literature regarding this matter are remarkable for their wide divergence. Park and Williams, Allbutt and Rolleston, Besson, and others stoutly maintain that lamblia is nonpathogenic. Still, on the other hand, considers that it is responsible for a chronic and intractable diarrhoea, a condition minor only in importance to amoebic dysentery.

The problems cannot yet be said to be solved. Sanford, in his study of 41 cases, came to the conclusion that lamblia should be considered as pathogenic, but that it produced no distinctive syndrome. In many of the cases there were diarrhoea without blood or mucus, rumbling in the bowels, lassitude, and nervous indigestion. Of the 41 cases 19 gave a history of over five years.

Wenyon and O'Connor consider that of all the flagellates in the human intestine the lamblia is that which is most probably pathogenic, but that it by no means always produces symptoms. They describe cases suffering from attacks of diarrhoea in which a large amount of yellow mucus was passed containing myriads of the active unencysted form of lamblia. Such atacks recur at intervals, always accompanied by the same discharge of infected mucus. In such cases it would appear that the mucus must be produced at the site of the infection, in which case the pathogenic action of the lamblia would be proved.

The experimental work of Fantham and Porter is of considerable importance. Kittens and mice were used. Marked diarrhoea was produced, and autopsy showed great congestion of the stomach and upper part of the intestine, together with, and this is particularly interesting, erosion of the cells of the mucosa, due apparently to the action of the suckers by means of which the lamblia attach themselves to the epithelial cells. They conclude that lamblia may be distinctly pathogenic in man, and they suggest that rodents such as rats and mice, in which the infection is particularly common, may very well act as a reservoir.

In our own case it is improbable that the Lamblia infection had anything to do with the symptoms from which the patient suffered.

The disappearance of the parasites after the use of magnesium sulphate was probably due to the disruptive effect which such a strong solution would, by virtue of osmotic action, produce on the delicate bodies of the lamblia. Only the shattered fragments remained to tell the tale on the following day. Methylene blue, arsenobenzol, and many other substances have been used in the effort to expel the invaders, but with little success. It is suggested that for this purpose strong solutions of magnesium sulphate are worthy of a trial.

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THE NATURE OF X-RAYS AND SOME OF THEIR APPLICATIONS

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THE discovery of x-rays and some of the developments of science which arose therefrom are illustrative of the uncertainties which hover on the horizon of the prospector in the investigations of the phenomena of Nature, uncertainties which are much like those that beset the prospector for precious minerals in regions of which even he has limited knowledge, and in which he has few fellow-explorers. He alone may have a well-organized and fairly extensive knowledge of the field in which he explores and he may, as he usually does, labor long and assiduously. He will, indeed, stake claims and gather nuggets which will add to the wealth of the world and stimulate further exploration. He must, however, always have in mind the possibility that some worker in a neighboring field may dig a cross trench, or that a chance visitor may make a lucky stumble and uncover the hidden wealth of his field of activity. This very uncertainty is the lure of the wilderness. It fascinates the explorer, and, once a prospector, it is impossible to turn him aside, even though the handicap of uninterested capital, the insufficiency of equipment in his pack train, or the active obstruction of trail followers threatens to overwhelm him. He presses on buoyed always by the hope that the result of his efforts, however long withheld, will be at last a philosopher's stone or an elixir of life.

X-rays was a "find" in the domain of the discharge of eletricity through gases. Röentgen at Wurzburg was a prospector in the field of light, and even there he was hardly a well-seasoned prospector, and in the former field he was only a casual visitor. A great deal of exploration in the realm of the discharge of electricity through gases, in which the findings were largely of a qualitative character, had been carried out by such men as Sir William Crookes, Sir J. J. Thomson, J. Plücker, W. Hittorf and others, and it was known, among other things, that the discharge depended in character, on the size and shape of the electrodes, on the potential set up at the electrodes, on the nature and pressure of the gas and on the size and shape of the containing vessel. It was also known that the discharge was of a twofold character, that negative charges were shot out from the cathode and positive charges from the anode, and particularly was it noted that when the pressure of the gas in the tube was low enough, there was a fluorescence of the tube near the cathode.

This fluorescent light interested Röentgen. He knew that ordinary light was complex and that if it were analyzed it presented a spectrum of various wave lengths, a portion of which was visible and other portions of which were infra red or ultra violet, and he knew that the ultra violet portion would excite fluorescence in certain substances, e.g., barium platino cyanide. He wished to know if this fluorescent light in the discharge tube had an ultra violet portion. He covered his tube with black paper to shut out the visible light, started the discharge, and, turning, found his barium platino cyanide screen on the table glowing beautifully. He next got photographic plates and found he was able to obtain shadowgraphs of dense substances enclosed in lighter material and in particular of the bones of the body through the encasing substance. Of course, others were interested immediately and the third outstanding property of the new radiation was quickly found, viz., that it would render a gas a good conductor, a property that became of considerable assistance in subsequent investigations. Röentgen thought the new radiation was a part of the fluorescent light from the bulb. It occurred to Henri Bequerel at Paris that if this were true one should find it as a part of the light from materials which were well known to have the power of fluorescing or phosphorescing after exposure to a bright light, such materials, for example, as calcium sulphide, zinc sulphide. His efforts were fruitless until he tried uranium salts, and here he found that a radiation was emitted even though the salts were not fluorescing. This new trail led to the discovery of radium, polonium, radio-thorium, actinium, etc., and to an extensive investigation of the properties of their radiations.

These discoveries almost immediately stimulated intense interest and activity in a wide sphere, not only in physics, but also in chemistry, geology and biology, and more particularly in the medical world. Here the significance of the discoveries was quickly appreciated and there was almost a stampede of prospectors. But, unfortunately, these prospectors, who might have co-operated advantageously, parted company. The medical man attached to himself or became attached to the instrument manufacturer and the physicist was left to blaze out further trails alone, logically perhaps, for he had not hitherto been associated very closely with either the medical investigator or the manufacturer. The results were disastrous. The trail is dotted with the remains of men who had been enthusiastic, but unguided and poorly equipped medical prospectors, with here and there the remains of an unfortunate patient, the sacrifice of those who gave their bodies or their lives to save their fellow-men. This was a tragedy which subsequent developments have shown conclusively might easily have been averted if there had been sufficient communion and co-operation between the pioneer explorers, the physicists, and the ill-prepared prospectors, the medical men, who followed.

But let us return to the trails which the physicists explored. The stream of negative charges from the cathode, and of positive charges from the anode were examined carefully and minutely, and their properties, including their velocity, their mass and the quantity of charge that is associated with them, were determined accurately. They were called cathode rays and anode rays, but these names gave place later to electrons and positive nuclei or ions. It was readily shown that the x-rays were not a part of the fluorescing light from the side of the glass tube, but that they were produced by the impact of the electrons on any material substance, such as the glass or the anode. A metal target was put in their path and the supply of x-rays was made more abundant. They were found to be complex, varying greatly in penetrating power and in photographic and fluorescing activity, and this was attributed correctly to the different speeds with which the electrons hit the target. Wehnelt discovered that electrons could be obtained more easily from a hot cathode than from a cold one. Extensive investigation of this source of supply and of the character of the emission of the electrons therefrom by Sir J. J. Thomson, O. W. Richardson, I. Langmuir and others led, on the one hand, through the production of the amplifier by H. J. Van der Bijl and W. Wilson, to the development of long-distance telephony and wireless telegraphy, and more recently to the development of wireless telephony and multiplex telegraphy and telephony, and on the other hand, through the skill of W. D. Coolidge and J. E. Lilienfeld, to the production of an x-ray tube in which a hot cathode is the source of supply of electrons.

Two types of generator for producing the high potential, which is necessary to give a high velocity to the electrons, were developed.

In Europe the induction coil, with various forms of interrupter in the primary, were in use, and in America the ordinary transformer or interrupterless coil was in general use. The stream of electrons which is obtained in the x-ray tube by the use of these generators differs considerably. The former generator gives a large proportion of electrons of high speed, but not, however, of continuously steady speed which by their impact on the target produce a beam of x-rays that has a correspondingly large proportion of penetrating rays, but which at the same time does not remain uniform, while the latter generator gives a steady stream of electrons whose velocities are more uniformly graded, and there is produced a beam of x-rays in which the varying penetrability is fairly evenly proportioned. Of recent years the coil with the interrupter has come into use in conditions where thick, dense materials have to be penetrated, e.g., in the investigation of metals, woods, etc. For less dense materials the interrupterless coil may be more advantageously used to show small gradations of density.

Meanwhile the actual character of the x-rays was in doubt. Many of the investigators, including Röentgen, considered that they were simply the electrons which bounded from the target, but which had lost their negative charges. If this was their character they should, when absorbed, give rise to considerable heat. But the quantity of heat developed when x-rays are absorbed in so small as to be difficult of detection. Others believed that they were waves produced by the impact of the electrons on the target, in a manner somewhat analogous to the production of light waves when two bodies moving with great speed collide. If they were like light waves they should, of course, have the properties of light waves, e.g., the properties of reflection, refraction, polarisation, diffraction and interference. But experiments to show these gave negative results. The instruments ordinarily used for the analysis of light are the triangular prism, a ruled grating or a plate of transparent substance whose faces are parallel and almost ideally plane or smooth. These instruments will decompose the light into a continuous spectrum of colors, red, orange, yellow, green, blue and violet, or into a line spectrum in which only small portions of the whole spectrum exist. Further, it is known that this does not comprise the whole spectrum, but that there are invisible portions, the infra red and ultra violet portions, and further it is known that this extensive spectrum means that the source sends out a complex beam of waves of various wave lengths. Attempts to analyze x-rays with these instruments failed. It was suspected that the failure was due to the shortness of the waves of x-rays and that the inequality or other conditions on the surface or in the interior of the prism, or grating, or plate were such that the waves were scattered, for in all these experiments a considerable scattering of the x-rays was apparent.

In 1912 it occurred to Laue of Munich to make use of the cleavage planes of a crystal which in a well formed crystal should be parallel and ideally plane. The experiment was carried out with the assistance of his colleagues, Frederick and Knipping, and was a great success. A spectrum of the x-rays was obtained. Professor W. H. Bragg and his son, W. L. Bragg, then of Leeds University, modified the experiment, making it exactly like the ordinary method of using a plane parallel plate with which to get the spectrum of light, and significant and far-reaching results were the reward of their efforts. They showed that both kinds of spectra existed. There was a continuous spectrum extending from wave lengths 1/1000 to wave lengths 1/10000 that of ordinary light. There was also a line spectrum comprising three series of lines, the K, L, and M series, whose wave lengths were characteristic of the metal of which the target was made. Almost immediately it was shown by Moseley at Manchester that the wave lengths of these characteristic lines bore a simple relationship to the atomic number of the element in the target, viz.: $V = A(N-B)2$, where V = the frequency, i.e., the number of waves emitted per second. N = the atomic number. A and B are constants for each series.

All of this development is of paramount importance to the medical radiologist, though much work still remains in the elaboration of the results for progressive development in medical applications. This time, however, there are evidences of closer collaboration with the physicists. Several hospitals have one or more physicists on the staff. The manufacturer himself, in an effort to keep pace with the requirements, has established a research staff of physicists, and in some cases these are associated with biologists and pathologists. The horizon is rapidly widening and the results of combined efforts are growing apace. Consider an example of this. Much experimenting has been done by empirical methods on the application of x-rays to organisms and cells for therapeutic purposes, but the results, though extensive, have been irritatingly contradictory. There were several methods of measuring dosage in use, notably the aluminum penetrometer and the Saboraud pastilles, and where penetrating x-rays were required, aluminum filters were used to absorb the softer radiation.

The discovery of the complexity of the spectrum of x-rays shows this to be unsatisfactory. Professor S. Russ, physicist of the Middlesex Hospital, London, had shown, by the application of the spectrum of ordinary light to bacteria embedded in a medium followed by culturing, that there was a selective bactericidal effect. It seemed almost imperative that the x-ray spectrum should be investigated similarly. First, however, the absorbing effects of different filters were carefully investigated with the following significant results. If a filter of any metal were used, say, aluminum, it absorbed strongly the wave lengths longer than that of its own characteristic emission spectral lines, but transmitted an intense beam of waves of this length, while it cut off practically all the general radiation of wave length shorter than this and much of the characteristic radiation emitted from the target. This result itself is illuminating to those who have had discordant results with targets of different alloys and aluminum filters, complicated by the fact that the organisms were different and the strong probability that the x-ray spectrum, like the ordinary light spectrum, is selective in its action. During the past year or two investigations have been in progress with a fairly precise knowledge of the targets and filters in use, and methods of measuring dosage are being developed in which the complications detailed above may be avoided The method which seems to give the most hope of success is based on the property which x-rays have of ionizing a gas, which is shown by the fact that the gas under the action of x-rays becomes a better conductor of electricity, while there is evidence from other directions that the changes which accompany the application of x-rays to organisms and cells are at least associated with an ionization process in these organisms and cells themselves, and the use of this property appears, therefore, to be the most direct way of measuring the quantity of radiation which is applied. This ionizing property of x-rays has recently been made use of by Major C. E. S. Phillips, physicist of the Royal Army Medical Corps, in a new method of measuring x-ray dosage during the actual process of application of the rays for treatment purposes, and the method gives promise of eliminating much of the uncertainty that has existed hitherto in the measuring of dosage.

A Layman's Defense of Animal Experimentation

The July issue of the Woman's Home Companion contains an important article, entitled "The Truth About Vivisection," by Mr. Ernest Harold Baynes, well known throughout the United States as an animal lover. Horrified by the statements of wanton, even demoniac, cruelty in laboratories, which he had read in anti-vivisection literature, Mr. Baynes determined to learn whether these statements were true, and, if true, to work vigorously for immediate abolition of the evil. He soon discovered that the literature was characterized by misstatements of fact, by perversions of truth, and by suppressions which were equivalent to falsehoods. His inquiry quickly led him to perceive that the two central propositions on which the anti-vivisectionists base their propaganda are that animals are ruthlessly tortured to gratify the curiosity of the heartless experimenters, and that the results are of no benefit whatever. The first of these claims he investigated by visiting, unheralded, a number of active laboratories and watching the experimental procedures. He found, not "brutality and heartlessness," but kindness and consideration. He was interested to observe posted in the laboratories certain rules regarding the care of animals. These were formulated more than a decade ago by the Bureau for the Protection of Medical Research of the American Medical Assn., and have been formally adopted and are being enforced in every medical school and medical research institute in the country. The claim that the experimental method in medicine has been useless Mr. Baynes learned was overwhelmingly disproved by unimpeachable evidence. In presenting the case to his readers he cites the results of diphtheria antitoxin, of asepsis in relation to surgery and puerperal fever, of anti-typhoid vaccination, and of the human experiments which disclosed the mode of transmission of yellow fever. No more effective attack on the methods and assertions of the anti-vivisectionists has ever appeared in a popular journal. It has stirred the anti-vivisection societies to frantic retaliation. For spreading broadcast this instructive examination of the misleading statements and claims of the anti-vivisectionists and of the procedures and achievements of experimental research in medicine, the gratitude of the entire medical profession and of well-informed citizens everywhere is due to Mr. Baynes and to the editor of the Woman's Home Companion. —Journal A.M.A.

UNSUSPECTED SYPHILIS OF THE NERVOUS SYSTEM: ITS LABORATORY DIAGNOSIS*

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IN THREE PARTS

PART ONE

THE intention of this paper is to present the subject of syphilitic involvement of the central nervous system as it exists when clinical signs and symptoms of disturbed nervous function are absent.

For many years it has been believed that even the late syphilis of the brain and spinal cord developed as a result of invasion of these tissues by spirochaetes during an early stage of the disease. Lang, in 1881, stated that "an organ which is the seat of a gummatous lesion must have been affected in the early period of syphilis."

The researchers of Neisser demonstrated that the organisms become generalized very soon after inoculation, and that the brain and other organs may be invaded long before the inoculation sore appears. By infecting monkeys experimentally and excising the site of inoculation at different intervals of time, he found that, if syphilis was to be prevented, it was necessary to excise this area within the first twelve hours; he also demonstrated spirochaetes in the blood five days after inoculation.

Eberson (1) infected rabbits by intratesticular injection and showed that as early as seven days after injections spirochaetes were present in the regional lymphatic glands and in the blood.

Brown and Pearce (2) performed similar experiments and found that the regional lymph nodes contained spirochaetes forty-eight hours after inoculation of the testicle. This was a constant finding. They also demonstrated that spirochaetes were in the blood at the end of a week. This early invasion was the commencement of a true generalized infection, for excision of the scrotum and testis at the end of forty-eight hours did not prevent the onset of generalized syphilis. They further pointed out that the nervous system of the rabbit may be affected very early in the disease. In one rabbit the spinal fluid was shown to contain *spironema pallidum* eight days after the inoculation lesion had appeared in the testis.

The fact that the spirochaetes become generalized very soon after infection is of practical importance. They are lodged in various organs long before any inoculation sore appears, and, therefore, in man, one may expect to find changes in the nervous system at the earliest time at which it is possible to make a diagnosis of syphilis.

The investigation of patients for evidence of early involvement of the nervous system has only been carefully studied within recent years. In 1903 Ravaut (3) examined the cerebro-spinal fluid of secondary syphilitics, most of whom were showing no evidence of nervous disease, and in a large proportion found increased cells and other abnormalities. Of 100 cases only 28 could be said to have had normal spinal fluids. When lumbar puncture came to be used more frequently the cases in the later stages of syphilis were found in turn to have similar alterations of their spinal fluids. From 1911 onwards there are occasional papers on this subject.

Zaloziecki and Frühwald (4) examined thirty cases of early syphilis without evidence of nervous disease. Eleven had cerebro-spinal fluids with increased cells—from 11 to 212 per c.mm., and two of these showed increased globulin and positive Wassermann reactions.

Altmann and Dreyfus (5) detailed the findings in 170 cases of syphilis in all stages. They found amongst the secondary and latent cases, twenty-seven with abnormal cerebro-spinal fluids and showed that the abnormality may be reduced by salvarsan treatment. Wile and

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Stokes (6) laid special emphasis on the occurrence in early syphilitics of "neuroretinitis," and of involvement of the auditory apparatus, as shown by diminished bone conduction.

In 1908 With (7) published a report of 316 cases whose cerebro-spinal fluid had been investigated. In all stages of the disease, including the primary, he found some cases with over ten cells per c.mm. in the cerebro-spinal fluid.

These and other papers giving sparse information, not here quoted, make it evident that abnormality of the cerebro-spinal fluid may be present in all stages of syphilis and may exist without clinical signs of nervous disease.

The basis of the present paper is a series of 1,314 unselected cases of syphilis, examined in a routine manner, as they appeared for diagnosis or treatment in a syphilis clinic. They were studied (8.9) in a Naval Hospital in England in association with Hon. Surg. Lieut.-Com. Paul Fildes, R.N.V.R., in charge of the laboratory, and Surg. Lieut.-Com. R. J. G. Parnell, R.N., in charge of the Venereal Department. The series includes every case of syphilis admitted to the department during the period of study. The obvious nervous disorders such as tabes dorsalis and dementia paralytica were admitted to the neurological section so that the results from the series are based on unselected cases and indicate what may be expected from a similar selection made at random elsewhere on similar material.

The routine examination consisted in fixing the date of infection as accurately as possible, although considerable effort was sometimes required to do this. Patients were stripped for clinical examination and lumbar puncture was performed. In a certain number the central nervous system was thoroughly investigated and the eyes and hearing were examined with the collaboration of specialists when this was indicated.

The cerebro-spinal fluid was examined within two hours after removal. This is important, as cells disappear if the fluid is kept (10). The cells in one-half a cubic millimetre were counted to ensure accurate results (11). Normal fluid usually contains no cells or at most one or two per c.mm., but to limit precisely the number that may occur within physiological conditions is a difficult matter. It was, however, the general opinion that a count of ten cells was distinctly high, and this number, therefore, was taken as an index of an abnormal condition. The cases that had between 5 and 9 cells per c.mm. (both inclusive) in their spinal fluid were classified as doubtful as to involvement of the nervous system, but results have shown that in all probability these cases were really cases of cerebro-spinal syphilis. Cells up to four in number were taken to be within normal limits.

In performing the Wassermann reaction the cerebro-spinal fluid was inactivated. The reason for this technique is an earlier observation by Fildes and McIntosh (12) that when the meninges are acutely involved, as in meningo-vascular syphilis, the reacting substance in the cerebro-spinal fluid may be demonstrably different from that found when the lesion is parenchymatous as in general paresis. In the meningo-vascular lesion the reacting substance is more thermolabile and they suggested that this is due to the presence of a transudate from the blood. That is to say, in this type of lesion the reacting substances in the spinal fluid are derived from two sources—the diseased tissues and the blood. In general paresis the blood transudate is not a factor; all the reacting substance comes from the diseased tissues. The difference consists in the presence of blood transudate in one case and not in the other. Normal serum, if unheated, is capable of giving a positive Wasserman reaction in low dilution and, therefore, when an acute meningeal lesion is present the unheated spinal fluid may contain a non-specific Wassermann producing substance. For this reason and in view of the large amount of cerebro-spinal fluid used in this series, a routine inactivation was adopted. Each fluid was tested in four tubes containing 0.8 cc., 0.2 cc., 0.05 cc., and 0.012 cc., using 0.5 cc. of a five per cent. suspension of sedimented sheep's cells.

No globulin or albumin tests were made in the cerebro-spinal fluids, partly owing to the pressure of work and partly for the reason that when the results of a cell count and a Wassermann reaction were at hand we could not see that globulin or albumin tests were of any assistance.

(To be continued in next issue.)

THE CLINICAL ASPECT OF SUB-ACUTE BACTERIAL ENDOCARDITIS

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THIS description of the Clinical Aspect of Sub-acute Bacterial Endocarditis was given before the Academy of Medicine, Toronto, November 7th, 1920, with an exhibition of the post-mortem specimens, and with the clinical history and post-mortem findings of the cases.

The entire bacteriological and pathological work in connection with the cases was done by Dr. G. W. Lougheed, who has included a summary of his findings.

The patients were all ex-soldiers under treatment by the Department of Soldiers Civil Re-establishment; they represent only a small proportion of the cases we have seen suffering with this condition and under treatment by the medical staff of the D. S. C. R.

Of the 25 cases which form the basis of this clinical analysis 23 have died, a post-mortem examination being held on 17. Two cases of this series, though still living, are included to bring out some point in diagnosis.

In the 14 cases in which we were able to obtain reliable information we found that the average length of service in France was 18.7 months. In one case the entire service was in Canada, and another saw 42 months in England only.

The past history of infection included, in order of frequency: Acute rheumatic fever, influenza, trench fever, tonsillitis, gonorrhea, pneumonia, P.U.O., pyorrhea, trench mouth and gas poisoning. While, as I shall point out, particular infections, such as acute rheumatic fever, are important, because they may define an area of lessened resistance to organisms in the heart valves, I have come to look upon a continued history of toxemia, no matter under what name or names it may have been sailing, as extremely important in diagnosis because it demands that sub-acute bacterial endocarditis must be excluded as a cause. Case 11 of this series is one example of what I refer to; his official medical history while in the army included P.U.O., myalgia, V.D.G., conjunctivitis, influenza, trench fever, tonsillitis and urethritis in fairly rapid succession within a space of two years. In such cases, where the man may have passed rapidly through the hands of several medical men who did not have the time or the facilities for a complete diagnosis, I have come to look upon such a nomenclature as P.U.O., myalgia, trench fever and influenza occurring in one case in a comparatively short time as being the individual interpretations of a prolonged bacteriemia, such as occurs in this condition, and not the series of different infections which the names would seem to indicate.

We know bacterial or other injury to heart valves is like injury to the endothelium of the blood vessels, and is peculiar in its results, inasmuch as the reaction must occur in the streaming blood. The common effect is the formation of a thrombus on the endocardium of the valves; it forms an irregular cap of platelets with a little fibrin and a few leukocytes and red corpuscles. This occurs on a tissue in the case of the aortic valve which has no capillaries, but, if the thrombus contains living bacteria, leukocytes wander through the valve and young capillary blood vessels stretch out from the base of the valve through its substance until they reach the vegetation. Then one sees a true inflammatory process in progress.

It is claimed by some observers that toxins may produce the lesions of the endothelium of the valves; numerous experiments have been made, some with success, but on the whole the work is not convincing. The view most generally held is that of the bacteria reaching the valves by way of the circulating blood, and, from the situation of the early vegetations one cannot escape the impression that they lodge directly on the surface of the valve. This is no indifferent point, as it is evident from the inspection of any large number of affected hearts, that upon the line of closure is produced the first effect of bacterial activity; the valves do not come together at the very edges, but rather along the somewhat thickened fortified line a short way back from the edge, this line being supported in the case of the semi-lunar valves by the corpora aurantii; thus it is along the line of closure that the film of vegetation appears; from here it extends so as to involve any other part of the valve, the heart wall, or chordae tendineae. How they lodge here has long been discussed, and it is generally thought that the mechanical beating together of the valves at this point catches up the bacteria in the blood stream and drives them into close contact with the tissues, so that they cannot slip by as they do over the smooth walls of the arteries.

Rosenow has revived the old theory that they reach the valves by capillaries He states that injections of streptococcus viridans in large amounts can produce bacterial colonies in the substance of the valves beneath the intact epithelium and that they are seen surrounded by hemorrhages two to three days after the injection and well before any vegetations appear on the valve. This is easily understood in the case of old vascularized valves which have been the seat of a previous inflammation, but in the healthy non-vascular valve it is very hard to understand. The most convincing experiment is that of injecting a dog's heart with india ink; the aorta is clamped and the carotid injected before the heart stops beating; on opening and washing the aorta in water one finds the valves standing out white against a black background. The capillaries ending like a top of a hedge along the base of the semi-lunar valves and not penetrating into the substance. It is also to be noted that the line of closure around the corpora aurantii is not perfectly smooth, but is slightly corrugated, and this even after the india ink has been washed away in a stream of water so that the endocardium is perfectly clear; under the microscope there can now be seen minute granules of the ink adhering in these irregularities. Is it not possible and more probable that these areas form a foothold for circulating bacteria mechanically, just as they retain ink particles.

Organism Observed.—Our series of 24 cases showed 14 instances of infection by streptococci with varying degree of power of hemolysis, three of streptococci non-hemolytic, two of staphylococci and two of pneumococci; there were three cases in which cultures were not obtained, but which showed the typical post-mortem lesions. One soon comes to the conclusion that cases of endocarditis may differ, first, according to the bacteria present, and, second, according to the localization of lesions. In some cases the organism predominating was not the usual non-haemolytic streptococci or streptococcus viridans, but a strain of slightly hemolytic streptococci. This strain of streptococci showed hemolysis very different from that produced by the streptococcus of puerperal septicaemia and the streptococcus pyogenes, haemolysis showing up one or two days later.

This type of endocarditis differs from others as regards localization in affecting first the aortic valves. In a few cases Dr. Murray states that the first signs were those of a mitral valve lesion, but the post-mortems revealed damage to the aortic valve, with the mitral showing only moderate degree of endocarditis. One must conclude, since all of these men had an average of 18.7 months' service in France, that strain plays a part in the localization of these organisms on the aortic valve. Another point of difference between this type of case and the streptococcus viridans type of endocarditis is that the vegetations involving the aortic valves are large, irregular, verrucose, vegetations showing ulceration of the vegetation itself with slight ulceration of the valve curtains and in some cases perforation of the curtains of the valve. Note: This process is not the same as acute ulcerative endocarditis, for at times the vegetations even showed calcareous deposits and the duration of the disease was six months or more. In several of these cases there developed in the course of the infection beautiful mycotic aneurysms varying from the size of a bean to that of a golf ball (see photos No. 1 and 2).

Pathological Investigations.—Sections of the heart valve showed the usual endocarditic masses, some showing fibrosis and young granulation tissues; others calcareous deposits, and in the majority of even the older ones there could be found, with a gram stain, colonies of bacteria near the surface of the vegetative mass. On sectioning the heart muscle from the base to the apex the interesting points brought out were the following: There were no true Aschoff bodies. In the majority of cases the muscle was clear at the base, but at the apex one could find fine perivascular infiltration of round cells and an occasional polymorph. In several of the hearts I located a fine colony of bacteria in the terminal small vessels of the heart near the apex, with accompanying inflammatory changes in the region of the vessel (see photograph No. 3). In other sections of the heart near the apex were found varying degrees of inflammatory changes (from early stage to a moderately advanced stage of fibrosis in a few cases). This fibrosis occurred in the region of, or following, the vessel in the one section from the case of staphylococcus endocarditis (the man was known to be ill and lived two months) showed irregular areas of acute polymorphous infiltration, the endocarditis was more the ulcerative type, one portion of the vegetation ulcerating off in a ribbon-like fashion and plugging the coronary orifice; this man had also a rupture of the right ventricle (see photograph No. 4), an exceptional heart in our series of aortic endocarditis. The kidney lesion showed the pathological changes one finds in the streptococcus viridans type, but of a more advanced nature. In several kidneys I was able to demonstrate a small embolus with a colony of the bacteria growing in the artery of the kidney with ac-

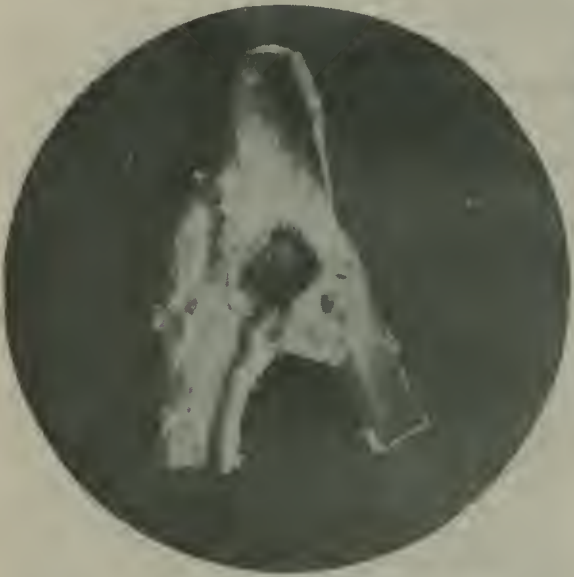

Photo No. 1.—Small Mycotic Aneurysm in the brachial artery just above its bifurcation. Note the small platelet mass at the mouth of the radial artery.

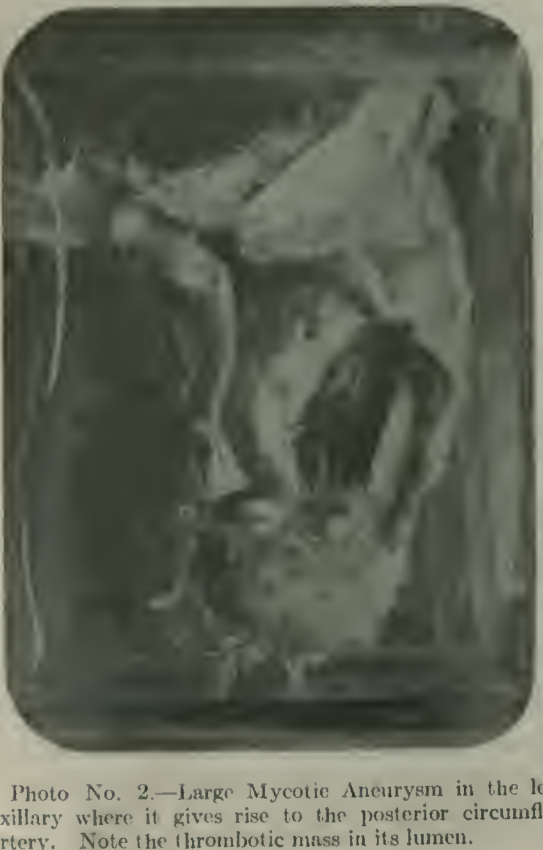

Photo No. 2.—Large Mycotic Aneurysm in the left axillary where it gives rise to the posterior circumflex artery. Note the thrombotic mass in its lumen.

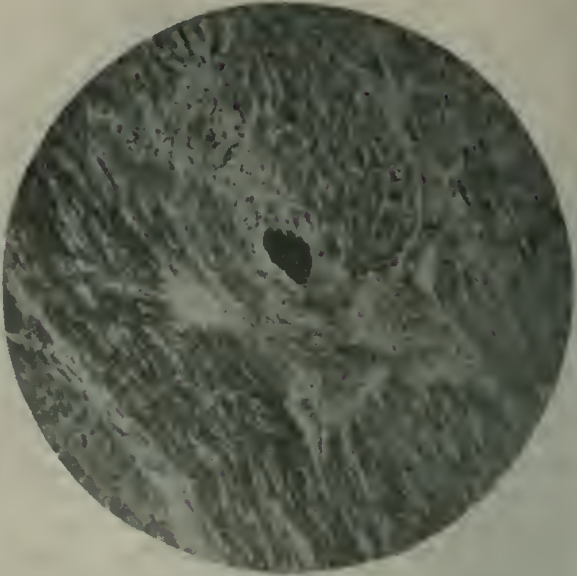

Photo No. 3.—Note the fine colony of bacteria in a terminal small vessel of the heart near the apex with accompanying inflammatory changes.

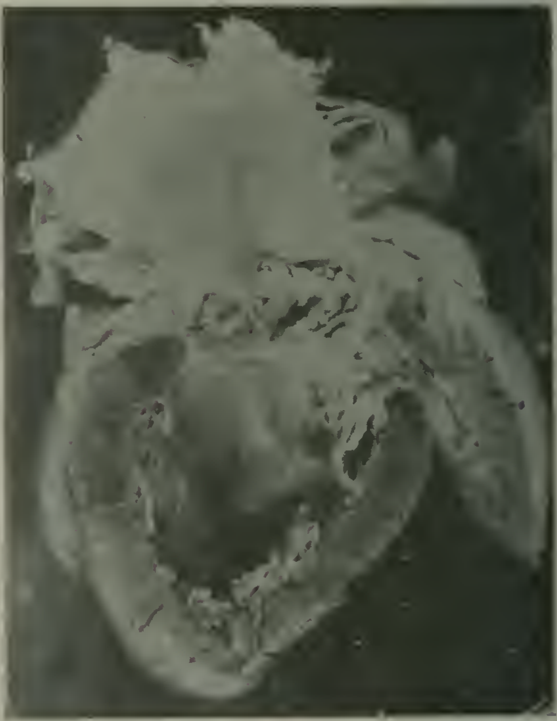

Photo No. 4.—Staphylococcus Endocarditis. Note that one portion has partially broken off and is plugging the right coronary artery.

companying acute polymorphous and round celled infiltration of the artery and surrounding kidney tissue (see photograph No. 5). One could find in the glomeruli little hyaline areas with one-half of the glomerulus adherent to Bowman's capsule and the other half apparently normal and trying to functionate, and in places complete fibrosis of numerous glomeruli, there generally occurred in the region of the glomeruli which showed this semi-lunar adhesion to Bowman's capsule, a round celled infiltration of the interstitial tissue close to the glomeruli.

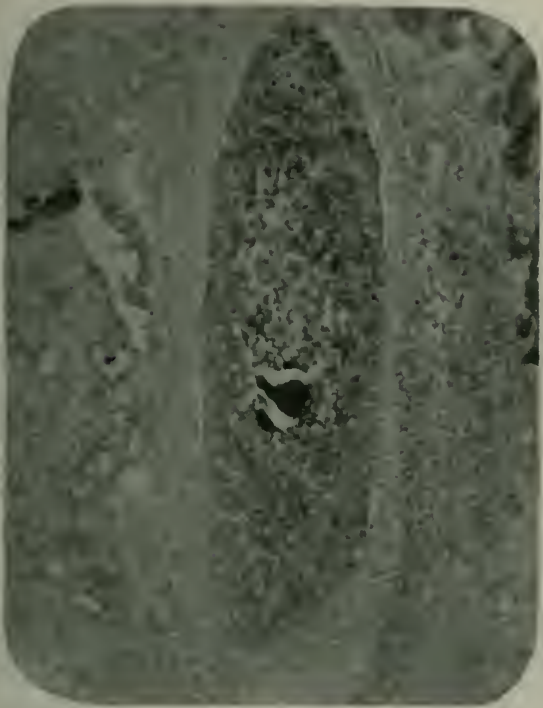

Photo No. 5.—Small embolus with a colony of bacteria growing in an artery of the kidney.

The Spleen.—In all these cases the spleens were markedly enlarged, some weighing as much as 600 grams. They were the typical splenic tumors one sees associated with acute endocarditis. There is always a great swelling of the splenic pulp, which on the cut surface bulges or spreads over the ordinary malpighian bodies so as to almost hide them from view.

There also occurred the usual infarctions seen in the spleen, kidney, mesenteric vessels, brain and other organs.

These cases of endocarditis appear to be a half-day stage between the well-established type of ulcerative endocarditis and the subacute endocarditis.

Clinically these cases have been recognized under various titles: Sub-acute Bacterial Endocarditis, Sub-chronic Endocarditis, Endocarditis Lenta and Chronic Infectious Endocarditis. You will see by the appearance of the post-mortem specimens that this group is closely allied to the acute ulcerative endocarditis, as in both types we have some degree ulceration of the heart valves, the difference pathologically, being merely one of degree. They differ clinically, in that acute ulcerative endocarditis is secondary to an active septic focus in some part of the body, and has an end result of pyemia with abscess formation in various organs; wheras in the sub-acute cases neither of these conditions prevail, as they follow some chronic or quiet infection, and the end result is not pus formation. I do not think that this distinction between the two forms should be insisted upon too strongly, for, although the variety and virulence of the organism may differ in the two types of cases, there is clinically much overlapping.

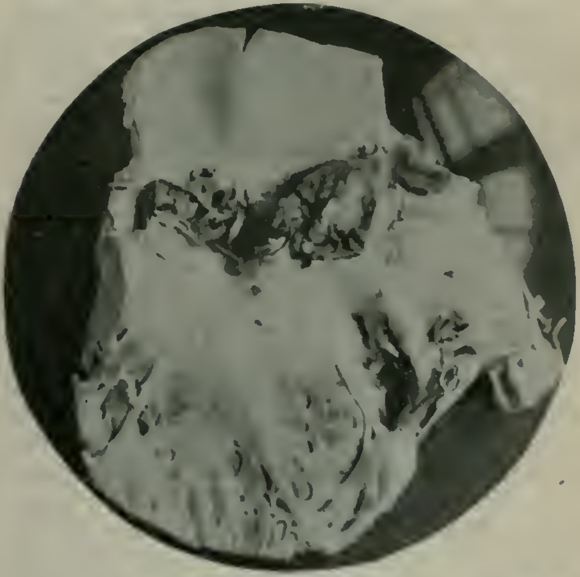

Photo No. 6.—A fairly typical heart of this series. Note massive vegetations on the aortic valves.

The important matter in these cases is their diagnosis. This must be from valvular defects on the one hand, and from acute rheumatic endocarditis on the other. Once it has been decided that an individual is suffering from this condition of sub-acute bacterial endocarditis it is almost certain that he will die in some short time, while in the other two types mentioned the prognosis is comparatively good.

In 1910 Schottmuller first individualized subacute bacterial endocarditis under the name of endocarditis lenta when he described five cases due to a green producing streptococcus. In the same year Libman described these cases under their present name, "sub-acute bacterial endocarditis." Later, in 1912, he showed that, while most of the organisms produced green in blood agar plates, yet some did not, and others produced slight clearing, but yet that all are of low virulence. It was he who insisted that these cases of endocarditis must not be confused clinically with those due to rheumatic virus.

Libman had found the green producing non-hemolytic streptococcus or streptococcus viridans in 95 per cent. of his cases, the remaining 5 per cent. being made up principally of cases due to the influenza bacillus. In this series a very different result has been obtained, as 66 per cent. of the cases were caused by a hemolytic streptococcus. This difference may in part be accounted for by the individual interpretation of the appearance of a blood agar plate as to grades of color change, but the question arises as to the possibility of a varying geographical distribution of bacteria or of a mutation of the organism.

In his paper before the British Medical Association in June, 1920, Libman divided his cases into acute and sub-acute, the acute being those cases which have an illness of about six weeks and whose infection was due to the streptococcus hemolyticus, staphylococcus, pneumococcus, gonococcus, and the influenza bacillus. This has not been our experience. The average duration of our hemolytic streptococcus cases was seven months. The staphylococcus case of this series was under observation four weeks and had been sick for a much longer time. We also have a staphylococcus case now under treatment who has a clear history of three years toxemia and cardiac signs, with three positive blood cultures of the staphylococcus made at various times since coming under our observation in December, 1919. In the past week a fourth positive culture of staphylococcus has been obtained.* This surely must show the overlapping of the different groups.

One sees from this that the duration of these cases is from three or four weeks to three years or slightly more, and in tracing the history of an average case from its beginning, that there is at first a bacteriemia, in which the toxic element gives rise to indefinite joint and muscle pains, most often at that time giving rise to the mistaken diagnosis of myalgia, P.U.O., trench fever, rheumatism, acute rheumatic fever, neuritis, D.A.H., and other such names. As time goes on the organism gains a foothold on one or more of the cardiac valves. This is the easier if the valves have been thickened as a result of previous rheumatic or syphilitic infection (possibly in the soldier cases, there is to be considered the strain of carrying a heavy pack). In such cases the valves form a point of lowered resistance on which the infecting organisms easily gain a hold. In this period, unless frequent physical examinations are made so that the evidence of an advancing lesion may be noted, it would be very easy to mistake the case for one of a simple valve defect. Later on, with the onset of embolic phenomena, marked valvular signs and increasing toxemia, no excuse can be made for omitting blood cultures and for overlooking the correct diagnosis and prognosis.

To state a case and to bring out some of the difficulties in diagnosis at the period when a correct one is imperative, I have included Case 21, a boy aged 21, with a history of tonsillitis in 1915 and again in January, 1920. The second time followed by pains in the joints and muscles and thought to be acute rheumatic fever.

On account of some doubtful features in the case Dr. Lougheed was asked to make a blood culture on July 8, 1920, and a short chain streptococcus, slightly hemolytic, was found.

In his examination Sept. 4, 1920, the following were the points made out in connection with the heart: A faint systolic thrill at the apex. Rhythm regular. Impulse forcible and fairly diffuse inside the left nipple line. Dullness 3½ inches from the midsternum to the left limit. There was a systolic murmur to be heard at the apex in all positions of the patient.

In such a single examination one might be led to make a diagnosis of a valve defect, namely, a crumpled mitral valve whose inflammation had reached a finality. A further examination, however, two weeks later gave again the above findings, and, in addition, a loud systolic murmur heard along the left border of the sternum and at the aortic cartilage; with the thrill at the apex; there was also a thrill felt in the subclavian artery. These further signs were taken by me to mean an extension to the aortic valve cusps. He is now fairly healthy in appearance, his temperature has been near the normal line for about two weeks, but if he goes along as the other cases in this series his course will be progressively downward.

While on the question of thrills as a point in diagnosis, it might be said that it is not common to find a real systolic thrill at the apex in a simple valve defect (one does frequently find a pseudo-thrill, systolic in time in a rapid actively beating heart, which does not mean disease of the valves). Further, that if a thrill is found it will appear late; the same may be said of aortic stenosis due to a chronic change. In this condition of sub-acute bacterial endocarditis thrills are frequent and appear early, and may be systolic or presystolic in time. One has only to look at these specimens we are showing to see the reason for this statement; it would have been strange, indeed, if some of these massive vegetations had not given rise to easily palpable thrills (see photograph No. 6).

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*Since this paper was written this patient has died. Post-mortem examination showed gross vegetation in a patent ductus arteriosus, extending down and involving the pulmonary valves—and mural endocardium of right ventricle. There was also a mycotic aneurysm of the lower branch of the right pulmonary artery. This case will be reported later.

Another point brought up in this case 21 is the extension of the progress from the mitral to the aortic valve. I have followed such an advance in a number of the hearts of this series, notably in Nos. 16 and 17, as well as in others not included in this series. It forms a valuable aid in diagnosis. Others again, evidently began as aortic affections and the mitral valve was involved secondarily. If we could see these cases early enough I am convinced that in all, some such advance could be noted, and we would at once have a clue to the type of disease. In some of these specimens you will note an advancing line of small vegetations along the aortic cusp of the mitral.

Having followed what might be called the ordinary or average case, it may give you a broader conception of this condition, if I detail one which, although of a common type, had a striking and tempestuous course from the beginning.

Such a one is case 11, aged 24, who developed hemiplegia while at his work as a machinist and was admitted to the hospital, where it was found that he had the physical signs of aortic disease.

With the evidence of an embolus sufficiently large to cause hemiplegia the signs of an active endocarditis of either the aortic or the mitral valve, the presumption was that the patient was suffering from either acute or subacute endocarditis of bacterial type, because in neither the rheumatic or the syphilitic forms are the vegetations sufficiently large to break off and block a large vessel. In this case a blood culture was made and an hemolytic streptococcus found.

The later history of this case was equally stormy, he had numerous emboli into various organs, one of these in the right kidney, simulated acute appendicitis and operation was debated.

Other and similar accidents happened. In case 8, where the patient was operated on for an acute abdominal state, an infarct of the mesenteric vessels was found.

In case 24 the patient died very suddenly; post-mortem showed a large embolus to the brain and the presence of gross vegetation on the heart valves.

Such cases bring out the complicating results and the meaning of emboli in this condition. Other points of origin of massive emboli are very few, and except for thrombi from the heart chambers occur but rarely.

It is to be remembered that the onset of this condition is usually insidious, the patient being able to carry on with some form of light work until the toxaemia becomes too severe or, until some startling accident occurs which renders him helpless. I cannot refrain from remarking on case 14, who was referred to me Nov. 5, 1919. His history was that he had pains in the muscles and joints from November, 1917, but continued fairly active and came direct from his work as a barber to see me. He was then profoundly toxic, had extreme pallor with a yellow tint to the skin and conjunctivae, his heart was large, the impulse diffuse and difficult to define, and he had murmurs throughout the cardiac cycle in all areas. He was sent to hospital at once, his progress was progressively downward, and a few days before his death he developed a severe continuous pain in the second right interspace near the sternum. He died Dec. 4, 1919, of rupture through an inflammatory exudate of the right ventricle, the culture in his case was staphylococcus.

In the photograph (see photo No. 4) of the heart, you will be able to see massive vegetations on the aortic valves, one piece of which has become partially broken off and is occluding the right coronary artery.

Coming now to the signs which are common to nearly all cases. Pallor is often early, even with a fairly high red blood count. I have attempted to note if the type of infecting organism was of any importance in determining its early appearance, and have thought that in the cases due to the hemolytic streptococcus it was sooner pronounced than with the other types. This was particularly the case in No. 16 of this series. In this patient the skin for weeks was of a remarkably translucent pearly whiteness.

Clubbing of the fingers is a valuable early sign in many cases. A similar condition may occur in valvular defects due to the rheumatic virus and other chronic changes, but in these conditions it is late in appearing, and is usually not so marked as in bacterial endocarditis.

The spleen is enlarged in most cases, quite often easily palpable, especially if there has been a fairly continuous fever or marked embolic phenomena.

Embolism, as you have already seen, is extremely common and its results form often one of the tragedies of the disease. An examination of the specimens we are showing to-night gives one an idea of how easily a portion of the friable vegetation can become dislodged into the blood stream and block an important vessel. In practically all of the cases of this series infarcts occurred into the spleen and kidneys, in a few into the heart and brain, in case 8 into the mesenteric vessels, and in case 4 into the axillary and popliteal arteries giving rise to mycotic aneurysms (see photos No. 1 and 2).

Petechiae and Osler's nodes should be classed as fine superficial emboli, and they should be constantly looked for in doubtful cases. If systematically searched for every day, petechiae will probably be found. They are small hemorrhagic areas, usually with a white centre, and are most often seen in the soft tissues about the clavicles, but they may occur in any portion of the skin. Osler's nodes are not common, but when found are important from a diagnostic standpoint. They are seen on the palm of the hand or about the ends of the fingers or on the dorsal surface of the feet; they come with great suddenness, are painful and tender, at first reddish in color; they soon change to a blue or purple and then fade away.

The temperature varies greatly in its character in the different cases. In some it is continuous with marked daily fluctuations, in others weeks or months may follow with only insignificant rises. As a rule it does not go very high.

The lodging of an embolus in any organ usually sets up a febrile reaction, perhaps only as a single steeple in the case without much fever, but for a few days fairly violent fluctuations may occur.

In the heart itself, there are murmurs, presystolic and systolic thrills, as I have already pointed out. The cardiac impulse is usually diffuse and difficult to define, no doubt because the muscle is flabby and the systole weak. The left border is difficult to define, probably for the same reason.

I have noted in a number of these cases that after a certain stage of the disease has been reached, the transverse dullness of the heart may suddenly increase markedly. I have never seen such rapid dilatation in any other condition, save in some cases of severe myocarditis with the sudden onset of a pathological rhythm such as auricular fibrillation or auricular flutter.

Another interesting detail is the length of time for which patients may maintain the recumbent position in bed; even when marked dilatation of the heart has occurred they do not seem to have to assume the position of orthopnoea; for example, the case I have already mentioned as having a staphylococcus infection for at least three years and as now lying with extreme dilatation of the heart at Davisville Hospital was able to remain flat in bed. These are casual observations, perhaps without very particular interest, but they have been of some diagnostic importance to me.

The treatment of these cases is very unsatisfactory and extremely discouraging, as almost all die. I have already pointed out the importance of a proper diagnosis, in order that they may be distinguished from somewhat similar conditions which have a more hopeful outlook. I have seen a great number of these cases in recent years, and in only two can I feel that the process has been checked for any considerable length of time. One seen by me at the Canadian Heart Clinic in England, March, 1917, was well enough to be driving a motor two years later, the other seen first about one year ago has been free from temperature for some months. Both are extremely limited in their efficiency and may only be in a prolonged bacteria free state, and further reinfection of the blood from the primary source of infection or from the heart valves may initiate a further activity, after which the course of their illness will be progressively downward.

In the treatment, transfusion of the blood serum, transfusion of serum containing antibodies against the homologous organism, vaccines and metallic salts of silver and mercury have all been used without the slightest influence in checking the active process. In two cases infected with streptococcus haemolyticus we saw a vaccine made from this organism clear up joint swellings and pain, but there was no evidence that the valvular inflammation was in any way influenced, as the patients' general condition rapidly deteriorated.

The time at my disposal will not allow of the discussion of other important features of this interesting condition, but I hope enough has been said to convince one that this very fatal infection is by no means a rarity.

Death, in these cases, is due either to sudden embolism to a vital part or to increasing toxemia with cardiac failure.

To Recapitulate:

(1) Preceding the actual occurrence of subacute bacterial endocarditis there is a longer or shorter period of bacteriemia during which the complaints are indefinite; general weakness, indefinite joint pains, dyspnoea, etc. These symptoms are a part of a general toxic state. At this time, except for mild or irregu-

lar fever, physical examination may reveal but quiet infection.

(2) The circulating organism gains a foothold on the valves of the heart. This may occur on valves which were previously perfectly normal, but it occurs much more readily on valves which were previously thickened as a result of old rheumatic or syphilitic inflammation. In the latter case, the thickened valves are not able to set up any great degree of resistance against the organism. The largest percentage of the cases belong to this class. Incidentally, this points out the important bearing upon any case, of chronic infections; this is specially true as regards these cases in which there has been a previous endocarditis.

(3) Having gained a foothold on the valve, the multiplication of the organisms, with the rapid deposit of platelets soon builds up a gross mass of vegetations which will give rise to thrills and to murmurs; since these are extremely friable, small or large pieces may become broken off, and emboli with infarcts in various organs, mycotic aneurysms, petechia, Osler's nodes, etc., will be seen.

(4) There may be little fever throughout the case. It may be seen occurring only with emboli, or the fever may be a prominent feature of the case and may go on for weeks or months uninfluenced by any form of medication.

(5) Suggestive features are pallor, clubbing of the fingers, and embolism; the latter may show in a large or small vessel, may be superficial, as demonstrated by the petechiae and Osler's nodes.

(6) Blood cultures may be positive on the first examination, but usually a number of samples of blood must be taken, as the blood stream is often bacteria free for long periods. A reinfection may coincide with the appearance of emboli. Cultures taken at these times give the best results.

(7) Treatment is unsatisfactory. One reason for this is that the reaction in the heart valves is insufficient to overcome the local deposit of organisms; these by persisting and multiplying continually reinfect the blood.

We are indebted to Col. J. M. Nettleton, Director of Medical Services, "D" Unit, S.C.R., and to other members of the Staff for kindly assistance; also to Dr. W. R. Robertson, pathologist to the Toronto General Hospital, for the miro-photographs shown.

TREATMENT OF CARCINOMA OF THE ANUS AND RECTUM

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IN preparing this paper I have taken into consideration an experience gained by seeing over one hundred cases, treated by various surgeons and myself.

Out of these one hundred cases only 28 per cent. admitted consideration of radical operation.

There have been a great many different operations devised for the treatment of carcinoma of the anus and rectum; to be mentioned are: "Excision by the sacro-coccygeal route" (Kraske operation), "excision by the vaginal route," "excision by the perineal route" "and "excision by the combined method" (abdomino perineal operation). When a radical operation is impossible, a colostomy should be done at once and radical operations that retain the anal canal are pathologically unsound.

The only sound radical operation is the two stage operation, colostomy, and later, extra or intra peritoneal excision, either by removing the coccyx, or with it, the two lower pieces of the sacrum, depending upon the extent of the growth upwards. This should be ascertained by internal examination, before the radical operation is commenced.

The first stage in treatment consists of an internal examination of the interior of the abdomen and in the doing of a permanent colostomy.

The abdomen is opened by making an incision through the outer part of the left rectus muscle, a little above the mid point, between the umbilicus and the symphysis pubis. The incision should be long enough to allow the operator to pass his hand into the abdomen, so that he can make a complete examination of all parts for extension or secondary growths. In examining, one should first palpate the growth in the rectum to make out if it is attached to the bladder in male patients or to the uterus in female patients; then the hand should be passed behind the growth to see if one can feel any enlarged glands behind the rectum in the sacral cavity. After having examined the contents of the pelvis, the hand can be passed upwards to examine the lumber glands for signs of enlargement. Lastly, the operator should palpate all the abdominal surfaces of the liver, that are accessible from the interior of the abdomen for secondary growths. If there are secondary growths in the liver, enlarged lumbar glands, or the growth has extended to the bladder wall, then the only treatment is a colostomy, but, if only the glands in sacral cavity are enlarged, even if the growth is attached to the uterus, the second stage of the radical operation, that is, resection of growth, may not be contra-indicated.

In doing a colostomy, a point about the middle of the sigmoid should be chosen for the opening. This will leave a portion of the sigmoid loop between the descending colon, and the opening which will act as a pouch, and will retain a large quantity of faecal matter for several hours, while the patient is in the upright posture. To fix the loop in position, it has been my custom to use silk or silk worm gut, instead of a glass rod. I take two large curved cutting needles, threaded with number three silk. I then pass the first needle through the anterior layer of the rectus sheath, rectus muscle, posterior layer of rectus sheath and peritoneum, on the inner side through the meso-sigmoid, then up on the outer side through the peritoneum, posterior layer of rectus sheath, rectus muscle and anterior layer of rectus sheath. I do the same procedure with the second needle, one and a half inches below the first. Next I tie the two inner ends of the silk together, then lift up colostomy loop until I have just the width of bowel above the skin, and fix in that position by tying the two outer ends. In sewing up the upper part of the peritoneum, great care is necessary to leave only three-quarters of an inch between the upper silk ligature, through the meso-sigmoid and the lower stitch in the peritoneum. The rectus sheath and skin should be sewn so as to leave the same amount of space for the upper loop, as previously described in sewing the peritoneum. The lower part of the wound should be sewn up in the ordinary way. The skin around the intestinal loop should be stitched to it by fine silk, and all the skin sutures removed in six or seven days. The colostomy opening should be made in the loop transversely four days later, and the whole thickness of the sigmoid cut through in ten days, leaving two openings, an upper, which is to be the artificial anus, and a lower which leads down into the rectum.

The second stage of the radical cure, should be performed in about a week or ten days after the first operation. The patient should be prepared in the ordinary way, with this addition, that the rectum is washed out daily with normal saline, through the lower opening for three or four days. If the vagina is involved the patient should have vaginal douches of lysol for the same length of time. When the patient is anaesthetized, he or she should be turned on the left side, with the right leg flexed, and drawn up towards the head, and the left leg extended on the table. The operator should now take a cutting needle threaded with number three silk, and pass a purse string suture, around the anus and tie tightly, to prevent any discharge from the rectum while the operation is in progress. The surgeon changes his gloves, while the site of the operation is swabbed over again with 2 per cent. picric acid in alcohol, or with iodine. The incision should commence at the upper border of the third piece of the sacrum, pass down the middle line over the coccyx, and then circle around the anus, at least one inch external to the purse string suture, back to meet the first incision, just above the anal opening. From the abdominal examination, at the previous operation, one has decided whether he can remove the growth, and a sufficient amount of the bowel, at least three inches above the growth, by either removing the coccyx, or, if necessary, the two lower pieces of the sacrum. The former is generally sufficient in female patients, but the latter step has often to be taken in male patients. One now dissects out the anus and rectum from below upwards, and a portion of the vagina can be removed, if it is involved by the growth; next remove all the fat and glandular tissue in the hollow of the sacrum. If the growth is firmly attached to the uterus the latter can be removed through the same incision. The growth may extend above the reflexion of the peritoneum, if so, the peritoneal cavity will have to be opened, in order to cut through the bowel sufficiently high above the mass.

To remove the anus, rectum, and growth, apply two large clamps about three inches above the upper border of the cancerous mass and cut the bowel across with the actual cautery, as close as possible to the lower surface of the upper clamp. The lower piece can now be removed. The lower end of the upper piece should be invaginated by two purse string sutures of number three silk, care being taken not to allow the needle to pass into the interior of the bowel, an accident which might be the means of infecting your wound. If the peritoneum has been opened, it must be closed by stitching its anterior layer to the wall of the bowel, leaving the invaginated end extra peritoneal. All blood vessels having been ligatured, and the vagina repaired, if necessary, the wound is sewn up in the ordinary way without drainage. In some cases, where infection has extended through the growth to the lymph spaces outside the bowel one must employ drainage by putting a tube in the lower part of the wound, or, in female patients, through an opening in the posterior wall of vagina.

After Treatment

The patient should be instructed to take purgatives only if necessary; paraffin oil is to be preferred. The bowels should be regulated to move each morning by a careful diet. After each evacuation the patient should be instructed to wash out the upper loop with warm water. The lower loop or sac should be washed out at least every third day, as there will be a certain amount of mucous discharge. After the daily lavage, a small pad should be placed over the opening, and the patient will usually be quite free from discharge for the next twenty-four hours.

Conclusions

This type of colostomy is the most satisfactory. It does not allow the continually exuding of faeces from its opening, for the following reasons: (a) The opening is surrounded on both sides and above by the rectus muscle, low by the permanent silk ligature. These structures have a certain amount of control somewhat similar to the sphincter muscle. (b) The pouch left in the upper part of the sigmoid, after once being emptied takes a great many hours to fill again. (c) When the patient is in the standing position the rectus muscle is more or less on tension, and helps to guard the opening.

Other advantages gained by this radical operation are: (a) The mortality is almost nil as compared with that of some of the other operations, e.g., abdomino-perineal, of which the mortality is 60 per cent. or over. (b) It allows one to remove the growth by dissecting wide of it. In some of the other operations where a resection is being done and an anastomosis of the two cut ends being made, one often does not keep far enough away from the mass and consequently a recurrence results. (c) In some of the cases of resection and an end-to-end anastomosis, the two ends are so put on tension that the stitches cut out, and thus allow the faecal matter to pass over a raw surface. This surface absorbs a certain amount of the noxious material of the faeces, and as a result the patient may succumb to a poisoning therefrom. There may also be produced a fibrous stricture, troublesome to a degree and difficult to keep dilated.

CHRONIC PAIN IN THE RIGHT ILIAC FOSSA

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THE attention which has recently been given to conditions associated with chronic abdominal pain has started lines of thought in many directions regarding fundamental conditions which may result in the development of chronic abdominal disorders. The last few years have developed a more thorough understanding of minor intestinal upsets and their earlier appreciation as warnings of a more grave lesion than was formerly suspected. There are many patients who complain of bilious attacks, dyspepsia and abdominal pain, who are persistently taking various mixtures, various diets, who are ever placing themselves under various new regimes, with results which are not only disappointing, but heart-breaking.

That such a state of affairs exists is due largely to a preconceived idea on the part of some physicians that the patient with indigestion has a disorder for which nothing definite can be done, and in such individuals the treatment has been simply symptomatic. That such a state of affairs should continue to exist not only reflects very discreditably on our ability to make a diagnosis, but emphasizes most strongly the fact that such an individual complaining of indefinite gastro-intestinal disturbances must not merely be given a placebo, but must have a most careful, thorough and painstaking examination in an effort to arrive at a diagnosis. That it is impossible to arrive at a definite diagnosis in a certain percentage of such cases is perfectly true, but if we use all the means at our disposal we can recognize fundamental pathological states which can explain the patient's semi-invalidism in a very large majority of cases.

The early history of such individuals is of extreme importance, because one is forced to believe that such a condition cannot occur in a short space of time. There is usually the history of gastro-intestinal upsets early in life, and that these were aggravated by severe physical and mental effort.

The particular type of individual to whom I wish to direct your attention is one who complains of gastric distress and abdominal discomfort; one, who, on a physical examination shows tenderness in the right iliac fossa. The pain and tenderness are not always associated. The proper appreciation of the significance of this association, or dissociation, of pain and tenderness in every abdominal condition, prevents many unnecessary abdominal operations in extra-peritoneal involvements, particularly in those situated just above the diaphragm. An individual may have attacks of acute pain associated with a certain amount of gastric distress—a feeling of uncomfortableness and fullness—but that pain will not be sharply localized; it will rather centre about the umbilicus, while physical examination may reveal tenderness in the right iliac fossa. I wish most strongly to state that such a case is very rarely suffering from so-called chronic appendicitis. That chronic appendicitis exists one cannot doubt, but that chronic appendicitis can exist as a clinical entity in the absence of any history of a previous acute attack, is very unlikely. That such is the case must be apparent to all who have had to do with chronic abdominal disease and who have reviewed the histories of the many patients who have had their appendices removed for a chronic gastro-intestinal disturbance without any amelioriation of their symptoms. No doubt such cases are often suffering from a cholecystitis which has been overlooked, but there is a fairly definite and not inconsiderable group of cases in which the pathology is situated in the right iliac fossa. It is to this type of case that I wish to direct your attention.

The affections or disorders which can exist in the right iliac fossa, apart from genito-urinary disturbances (which do not enter into this discussion) have to do with abnormalities in the caecum, appendix, ileo caecal valve, and the terminal ileum. We must realize that one is never justified in making a diagnosis of chronic appendicitis in the absence of the history of an acute attack, unless he has satisfied himself by all the means at his disposal that the other three possibilities are not factors in the patient's ill-health.

Much has been written recently regarding the incompetency of the ilio-caecal valve, or what is more accurate, the ileo-caecal sphincter, because its function in preventing the regurgitation of caecal contents into the ileum comes about as the result of muscular spasm of the ileo-caecal sphincter. Operations have been devised whereby such incompetency may be remedied.

However, it is a well recognized fact that there are many people having incompetent ileo-caecal valves proven by x-ray who suffer no inconvenience whatever. Thus one is forced to believe that there is some factor in addition to the incompetency of the sphincter.

On radiographic examination, one finds that the subject with an incompetent sphincter has in addition a recurring ebb and flow of the barium from caecum to ileum and back again, for varying periods of time, with, in addition, definite radiographic evidence of caecal retention. The explanation of this, then, seems to be that the musculature of both the ileum and caecum is incapable of maintaining the onward flow of the intestinal content. In other words, there must be a defect in the muscular activity of that portion of the gastro intestinal tract. The cause of such defect is at present more or less indefinite. The pathological findings in such instances will, however, be dealt with subsequently.

Symptomatology.—While it is not always possible to make a positive diagnosis from clinical examination alone, yet if one is painstaking the condition will at least be suspected, and will either be confirmed or disproven by radiographic findings. Those affected with this altered function of the caecum have usually suffered from ill-health and from many physicians over a period of years. Their complaint is, that of never feeling absolutely well and that of having had from time to time, acute exacerbations characterized by pain, abdominal distention, with probably nausea and vomiting; on physical examination one finds tenderness in the right iliac fossa.

In a large percentage of these cases, this relationship to physical and nervous strain is so definite that many such individuals are classed as neurasthenics. They have rarely the feeling of extreme well-being; are relieved by rest and change of environment, but the symptoms will recur as soon as they return to their usual occupation. The time of occurrence of their distress is of extreme importance. It is very rarely that breakfast is enjoyed; in fact, in many individuals the history is elicited that on arising in the morning there is a feeling of abdominal discomfort. This time of occurrence may serve to differentiate such chronic lesions from those of the upper abdomen, such as cholecystitis and gastric or duodenal ulcer. Physical examination will reveal very little except tenderness (which is not severe) when the right lower quadrant of the abdomen is palpated.

Radiographic findings: Radiographic examination of such individuals is not complete unless, in addition to the usual barium meal, the individual is given a barium enema. During the progress of the meal there is usually a very marked evidence of an ileostasis, associated with varying degrees of caecal and appendicular retention up to one hundred hours, or even longer. When the enema is given there is found to be a varying degree of incompetency of the ileo-caecal valve with a marked ebb and flow between the caecum and ileum. In one instance it was impossible, by means of x-ray, to demonstrate the communication between the caecum and ascending colon, despite the fact that an excellent shadow was obtained of the hepatic flexure and the remainder of the large bowel, the obvious inference in such a case is that the obstructed area shows as the result of pericholic adhesions.

Diagnosis—In the past, with such radiographic findings, a generally accepted diagnosis would have been "chronic appendicitis, with adhesions." The tragedy of surgical intervention in such cases must be well known to all of you, if your operation consisted in appendectomy, and the breaking down of adhesions. Such cases, once they have had their appendix removed, become repeated subjects for operation for intestinal adhesions; the futility of this procedure is evident.

Given such a clinical history, and the above radiographic findings, a complete diagnosis would appear to be atony of the terminal ileum and caecum, with incompentency of the ileo-caecal valve.

Treatment and Operative Findings.—Unfortunately in these cases a minor operation cannot be advised. No less a procedure than a resection of the terminal ileum, caecum and ascending colon to a point proximal to the hepatic flexure will produce the desired clinical result. When the abdomen is opened, the pre-operative diagnosis is confirmed by finding the lumen of the ascending colon compromised by bands of adhesions. The caecum is dilated and thin-walled, possesses none of the tone or elasticity seen in a normal bowel. When the walls are pressed together there is not that rapid return to a normal contour which is characteristic of a healthy caecum. It rather lies flaccid, with a tendency to remain in a distorted shape. As an etiological factor there is, in the majority of cases, no gross lesion present, but in some cases one finds masses of calcareous mesenteric glands—tombstones of a pre-existing tuberculous adenitis. In such instances it is not inconceivable to believe that the motor innervation of the caecal musculature has been interfered with, and thus, is produced, the lesion found. When, by operation, the diagnosis is substantiated, a resection of ten to fourteen inches of the terminal ileum, caecum and ascending colon is done to a point where one is sure that healthy large bowel is existing. In one instance it was necessary to remove the large bowel to the mid-point of the transverse colon, and it is surprising to note the definite line of demarcation between normal and abnormal large bowel. In one instance, where a primary side to side anastomosis had been done between the ileum and the large bowel, the caecal and ileal stumps both dilated, resulting in retention of intestinal contents, and a recurrence of the symptoms, making it necessary to do a resection of the anastomosis. Since this experience we have never done any anastomosis other than an end to end, using Balfour's method of splitting the antimesenteric wall of the ileum, in order to create a stoma sufficiently large to allow of an anastomosis with the large diameter of the colon. We have had such anastomoses subsequently radiographed, and as far as function at the site is concerned, it leaves nothing to be desired.

In conclusion let us say:

First—That it is earnestly hoped that a presentation of this idea will at least cause us to hesitate before making a diagnosis of chronic appendicitis with adhesions, and removing the appendix and breaking down the adhesions through a small incision which permits of no exploration.

Secondly—That when a patient who has had such an operation done returns for treatment, we should be very guarded and should investigate the situation with all the means at our disposal before we advise an operation which will again consist in simply breaking down adhesions.

Thirdly—That atony of the caecum and terminal ileum is a clinical entity due probably in some cases to a pre-existing tuberculous adnitis interfering with the inervation of the caecum, due in others to some unknown cause resulting in altered functions of the ileo-musculature, because with one exception histological examination of tissue removed shows no evidence of an inflammatory reaction nor of muscular atrophy.

Fourthly—That an end-to-end anastomosis between small and large bowel is the operation of choice when such a resection is necessary.

Fifthly—That the clinical result is surprisingly good, and completely justifies the formidable surgical procedure necessary for its attainment.

THE TREATMENT OF THE PSYCHONEUROSES*

Geo. F. Boyer, M.B., M.D.,

Too often in the past we have been content to label the psychoneurotic patient with a name and then empirically prescribe. After having made the diagnosis of psychasthenia, neurasthenia, hysteria or anxiety neurosis we have been too content to prescribe physical and mental rest, or electricity and massage with change of environment or some other part of the armamentaria in vogue and pay little heed to the underlying psychological processes which have driven their prey to earth. We may hope that time will smooth out the ruffled consciousness and problems of these poor victims of circumstances. In selected cases these simple methods may suffice and at least for a time accomplish a happy solution; but too often this does not take place and the patient sinks into a more chronic state of invalidism. It is not sufficient to diagnose that in some cases these types are but sub-normal people, defectives, morons, heberphrenias, etc. This is but an admission of weakness, and excuse for failure in dealing with some of these types. It is here that the controversy is staged between the neurologist and psychiatrist, as to definitely defining each his own domain. If the normal individual is subject to disturbances of consciousness and composure under the stress of emotion so much more so is the person who is less fit mentally to cope with the problems of life and their resultant mental disturbances. The problem is more efficiently dealt with and best solved by making the patient better able to understand himself.

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*Read before the Academy of Medicine, Toronto, January 11th, 1921.

In order to better discuss the subject I have sub-divided the treatment into sections that to me have seemed to be essential in dealing with the psychological mechanisms in these cases.

(1) The sympathetic appreciation of the patient's problems.

(2) The careful detailed physical examination of the patient.

(3) The discussion with the patient of instincts, emotions, associations and repressions.

(4) The realization by the patient that he has limitations of his mental faculties just as arbitrary and as absolute as limitations of his physical activities.

The patient must have full confidence in his adviser and physician. In this respect the respected and honored family physician often has an unique opportunity to effect a "cure" by his firm assertion that a specific phase in his case is a fact. The patient, accepting this, sets at rest his complexes. Years ago Dubois made the statement that the psychoneurotic is "cured when he believes he is cured," and it is upon this hypothesis that an arbitrary statement sometimes effects its result. As soon as he ceases the introspective search for defect he ceases to find rationalization for his conviction of disability. The physician must be able to inspire respect and trust. He must be sympathetic, patient, self-possessed, understand human nature because of his association with his fellow-men and his knowledge of the world. His conversation must be plausible and reasonable, and he must have a special interest in his calling. If these qualities are present a full investigation of the patient's history and his confidence and co-operation are assured. The patient's earliest impressions in childhood, his early ideas of right and wrong, his fears, his joys, his failures, impulses and difficulties, must be listened to and inquired into to gain knowledge and give the physician facts upon which to base his deductions and explanations. This investigation of history gives the patient a feeling of confidence which in turn usually leads to a very essential factor, namely, self-negativism. The self-negative patient will "open out his heart" and tell his problems and their consequences with the conviction that he has an understanding ear. All of this takes time; but it is essential in gaining knowledge of the instincts and emotions that have driven the personality. We learn of the child with the early over-development of the tender emotions showing themselves in incidents in every-day life; of disturbed behavior from sympathy or fear. Or perhaps we learn of the over-development of self-positivism in the precocious child who perhaps later will be the subject of bashfulness, which is the confusion of consciousness resulting from a conflict between self-positivism and self-negativism. The wide reputation of some shrines and the confidence of the patient are often the mainsprings of assistance in effecting their "cures." This perhaps applies more particularly to the hysteric who is always susceptible to suggestion, providing it is to his interest to re-act in a given way. The hysteric has a phase which can be summarized at one period of his consciousness by a concealed, illicit, morally untenable motive. This has frequently been shown in the soldier confused by the simple complexes of fear which he misinterprets as cowardice and then reasons logically that punishment will be meted out to him and frequently a conversion hysteria develops and he is carried from danger with an hysterical paralysis or contracture sometimes after the slightest initial injury. It is not sufficient to use electricity, chloroform, or massage, and leave his complexes to take care of themselves and remain unsolved or become associated with civil life. The thorough history of such cases, the discovery and bringing to places of importance, preceding incidents, is essential in dislocating his rationalization and in gaining his confidence. The full and free discussion of his daily problems and their development is essential in all psychoneuroses The psychoneurotic is often in danger of arguing himself into a position of inferiority in his own eyes and he seeks rationalization in slight physical ailments. Many of the minor gastric, cardiac, and sexual maladies or irregularities are as it were seized upon by his consciousness to justify to himself the full confidence that he is suffering from gastritis, disordered action of the heart, or impotency. As a result he sets up a deep seated and well rationalized anxiety or fear which only aggravates his physical condition.

It is essential before anything further is undertaken in the examination that a careful and full physical examination be made. It is not sufficient to examine the heart and pulse of a patient and assure him that his heart and life are safe. This has probably been done repeatedly on previous occasions. Too often the diagnosis of neurasthenia has been made in a casual way and the admission is made that the patient has "nerves" and he is subjected to rest. This may suffice, but more often it does not. The examination should be as exhaustive as possible and in many cases cause will be found for disturbance in highly emotional personalities in minor physical defects. Perhaps before we make the diagnosis of a psychoneurotic condition too readily we need to know a great deal more of the effects of infections generally. Adler has brought to prominence the neurotic constitution and the organ inferiority hypothesis. I am not an adherent of the too often followed doctrine that all psychoneurotic patients should have all physical defects corrected by radical surgical procedure. Many of the so-called splanchnic or sexual neurasthenias are only made worse by laparotomy and removal of doubtful appendix, tube, or ovary,or dilatation of cervix or urethra. These procedures sometimes do relieve temporarily, and then the symptoms return, not because of the return of the offending condition, but because of the susceptible personality. These patients are often made worse by being operated upon. The examination cannot be too exhaustive, for by it alone often the patient is convinced that the disturbing factor will be found and remedied, or if not found the patient may say, "Surely only an unfounded anxiety." It may be in time that all of these types will be placed in the category of organic disease through the advancement of more thorough and modern investigation. We have only to remember our own cases of early or incipient disseminated sclerosis, obscure infections of the nervous system, brain tumors, syphilis of the nervous system, old injuries of the brain and cord, and many other defects, to learn with what ease we have too often been suspicious or made the diagnosis of, neurasthenia, hysteria, psychasthenia, and the neuroses in the past, only to be proved wrong at a later date. It is quite a natural pitfall, but one we must avoid if possible.

Having established to our own satisfaction that the physical occupies a very subsidiary, or no part, in a given case, we are then in a position to make suggestions.

Freud in his pioneer work on psychoanalysis pointed to the instinct of reproduction and the emotions relative to sex as the driving force in all, but surely he has made his exhaustive analysis of one only of our chief instincts! We have at least another of equal potentiality in self-preservation. This instinct is guided by the emotions of fear and flight, but fear and flight seem contrary to the recognized law of man because of their confusion with cowardice, hence we have the fundamentals for conflict in the un-analytical. Civilized man must bring the two instincts of sex gratification, and desire to avoid pain, under control. They are controlled by the logical and idealistic aspects of consciousness, just as the thalamus (which may be their centre) is subjected to the control of the cerebral cortex. As long as harmony exists the course of events is orderly. The instincts assert themselves at times and at other times are subservient, but when this relationship is disturbed, mental conflict becomes manifest and the patient is a fit subject for a conversion hysteria or anxiety neurosis. Perhaps in time, minute changes will be found in the basal nuclei which will alter the functions under psychological stress helping to explain perhaps some of the disturbances of emotion.

Concluding that the patient's condition is due to mental conflict, we must try to isolate the emotion conflicting with the comfortable course of consciousness. Many of these cases are given to dreams of their repressions—that is, when the censorship of consciousness is lost in sleep, the emotions take charge, and perhaps imprint themselves upon the consciousness as a dream. This is often best seen in the simple dream of the soldier. The battle dream when the scenes of battle are rehearsed with tenfold detail and horror are but the repressed fears of the working hours. This of necessity brings us into contact with suppressions and repressions. When an incident simply fades into the state where it cannot be recalled to consciousness it is forgotten; but when an incident or action clashes with the law of society or practise, as understood by its host, our active effort is made to suppress it and this creates a repression. Unrest and rest "cannot live peacefully in the same host," and so the individual exists in a disturbed state or like "a house divided against itself."

It is the reasonable, rational discussion of instincts and their emotions on the one hand, and the ideal, and logical aspects of consciousness, on the other, that will lead to the better understanding of these cases by themselves They will be better able to cope with disturbances such as loss of sleep, tremors, restlessness, pulse disturbances, etc., after their complexes have been "dug up" and "aired." If the neurotic is allowed to continue his repressions and other abnormal defenses and maintain argument and "logic tight compartments" in his consciousness, he will always have sufficient complexes to produce the symptoms and signs which bring him to the doctor. If he is treated empirically with rest, occupation, seclusion, etc., time will help efface the complex and it may not return, if it is not recalled sufficiently vividly in the daily stress of life. The complexes of sex in psychoneurotic individuals clash frequently, of course, with our ideas and accepted teachings of society and religion, and as a result morbid anxieties and hysterical prenomenia often result. The simple method of mental catharsis is often helpful, for it creates an atmosphere free from repression, a relief post to the patient, where he can discuss his most intimate complexes with a trusted mentor. The maintained repression narrows down the stream of consciousness and so makes the transient amnesia possible and troublesome; we cannot naturally devote our whole consciousness to any subject if a great part of it is devoted to maintaining logic tight compartments. If these are fully discussed and freely explained we have made possible, useful work, play, or any physical diversion, for we have aided the patient in giving to that diversion the greater part or all of his attentions and consciousness. The patient must learn that he has a limitation of his mental faculties just as arbitrary and as absolute as are limitations of his physical activities. He must be re-trained to depend upon himself within these limitations and to know the dangers of exceeding his points of endurance. It is difficult to treat this type of patient in his home in the environment where many of his compleves were developed and rationalized; therefore, the properly organized institution is the bost effective place for dealing with them. The institution should have all modern appliances for diversion, and all conditions inviting its occupant to restful mental activity and moderate physical exercise. The greatest asset to the institution, however, is the physician who discusses, examines, explains and stimuates his patient and is not merely content to make his sanitarium a harbor of passive refuge.

High Blood Pressure Stasis

Whatever difference of opinion may exist regarding the factors concerned in the production of high blood pressure, Arthur R. Elliott, Chicago (Journal A. M. A., May 28, 1921) says that general agreement must concede that when such a condition has come to pass it represents a state of circulatory strain. The net result of persistent high arterial blood pressure, after due allowance is made for physiologic factors of adjustment, is overwork to the dynamic side of the circulation—the heart and the arteries. For a variable period, compensatory adjustment proves adequate to maintain circulatory equilibrium; but in the course of time, demands on the heart resulting from the stress and strain of a continuously elevated blood pressure outrun cardiac adaptability, and exhaustion of the heart muscle supervenes with circulatory failure. The form of heart failure most frequently encountered is a gradual exhaustion of myocardial tonus, with the characteristic syndrome of progressive asystole and falling blood pressure. In still another group of cases the blood pressure formula remains but little altered, despite the steadily increasing circulatory embarrassment; and until the inevitable antemortem fall in pressure supervenes there exists the anomaly of a failing ventricle with a sustained blood pressure. The name "high blood pressure stasis" has been applied to this condition. High pressure stasis appears to possess certain interesting characteristic features. Chief among these are rapid pulse, gallop rhythm and pulses alternans. Auricular fibrillation rarely, if ever, occurs. Pulsus alternans is a frequent development in these cases and, once present, is usually permanent. One of the most interesting and constant physical signs observed is the presystolic gallop rhythm. When once established it never wholly disappears, and it has proved a sign of grave significance. In high pressure stasis occurring as one of the phenomena of the terminal stage of chronic nephritis, blood nitrogen accumulation may attain high figures; whereas in non-nephritic cases but little waste nitrogen retention has been observed. The most striking characteristic of the blood pressure formula is marked and persistent elevation of diastolic pressure. A rather interesting feature of the state of advancing stasis is the general absence of edema. The nature of the causes which contribute to bring about this form of circulatory failure renders the prognosis a serious one, increasing in gravity according to the degree with which the vicious circle as between heart and arteries becomes more firmly established. There are but three measures of treatment that appear to exercise any control in this condition. and they are rest, venesection and digitalis.

Retrospect

ON THE INFLUENCE OF A DIET WITH HIGH PROTEIN CONTENT ON THE KIDNEY

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The kidneys play the chief role in the removal of the solids resulting from the various processes of metabolism. Water and carbon dioxide can, and do, escape in quite large amounts through the lungs and skin, but the waste products of protein metabolism, urea, uric acid, creatinin, and other substances of unknown composition, can be excreted only in solution in the urine. Through the kidneys also escape various substances of a toxic and non-toxic character, which may be introduced into the body either by accident or disease. Thus mercury, arsenic, and the toxins of disease processes, pass through the kidney, and if present in sufficient concentration may damage the organ, giving rise to cellular degeneration.

It is a matter of common knowledge that the heavy meat eater is a frequent sufferer from vascular disease, hypertension and nephritis, and it has been suggested that the hypertension itself is due directly to the high protein intake. Mosenthal, however, shows that high protein diets for periods up to four weeks cause no constant change in the blood pressure, and that low protein intakes also fail to affect the systolic pressure, although in both cases the blood nitrogen figures show marked variation during the periods of unusual feeding. This would seem to indicate that the increased pressure of hypertensives is due not to an excessive nitrogen metabolism, but rather is secondary to some other condition. From the standpoint of symptoms, however, these cases show marked improvement under restricted protein intake: the morning headache disappears, the nocturnal polyuria is decreased, and the general health improves, showing the benefits of protein restriction.

In this respect the recent work of Squier and Newburgh is of more than ordinary interest. In 1919 Newburgh claimed to have caused nephritis both of the sub-acute and of the chronic type in rabbits, by feeding large amounts of protein for periods ranging from one to twelve months. The diets contained two to three times the normal amounts of protein, in some cases as egg white, in others as casein, while in a third group it was given as a vegetable protein (soy bean). Careful urine examinations showed albumen, casts, and often red blood cells soon after starting the diet, and after three to twelve months' autopsy showed nephritis of varying type and degree, according to the variety of protein used in the food. The animal proteins seemed to give the more acute types of lesion, the vegetable proteins a more slowly advancing disease, very similar to the chronic nephritis seen in man. The albumen in the urine was shown to be rabbit serum albumen, proving that it did not arise from a simple leakage of foreign protein through the kidney cells. Newburgh also showed that long continued dosage with urea did not damage the kidneys, and concluded that the nephritis was due to certain digestion products of the proteins, and not to the large excretion of the simpler nitrogenous substances.

There has been a certain amount of criticism of the validity of these conclusions, but Squier and Newburgh in a recent paper report two series of experiments on man in which the latter's original conclusions seem to be vindicated. In "essential hypertension," i.e., high blood pressure without albuminuria or casts, the kidney shows frequently a marked degree of irritability, as evidenced by an over-response to stimuli. There is an unusually high excretion of 'phthalein (80-95%), the blood urea is low, and its rate of excretion high.* Such cases would be expected to give early evidence of increased irritation if subjected to increased strain. In a series of four hypertensives with urines containing at most a faint trace of albumen, no red blood cells, and who had slight to marked retinal changes, Squier and Newburgh report that the taking of a high protein diet is followed in from one to twenty-one days by the appearance of many red blood cells in the urine, by an increase in the albumen, and in three of the four the retinal changes showed an increased activity. In three cases of very early nephritis with normal pressures, red blood cells appeared after two days of the high diet. In all but one of these seven cases the hematuria disappeared promptly after the reduction of the diet, showing conclusively that the appearance of the blood was related to the heavy protein intake.

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*Lewis, D. S. Clinical Value of Ambard's Coefficient of Urea Excretion. Arch. Int. Med., 1917, Vol. 19, p. 1.

An additional point of interest was elicited in a series of four persons with absolutely normal kidneys. It was found that two meals each consisting of one and a half pounds of steak and given at a six-hour interval, produced a hematuria in every case. This blood promptly disappeared after the diet was stopped, none of these cases showed albuminuria at any time during the test period, and subjectively had no inconvenience, except a slight feeling of having overeaten. This appearance of blood in the normal urines robs the test of any value it might have as a means of identifying very early cases of kidney damage.

While it is true, as some authorities claim, that there are dangers in a too rigid limitation of the protein intake, still such a diet is so difficult to enforce that one rarely meets with the picture of protein starvation. On the other hand, instances of protein overfeeding are being met with constantly, and these papers serve to emphasize the need of moderation in the use of protein at all time, and especially in cases of renal damage.

A further point of interest is the difference in the type of injury caused by the animal and vegetable proteins. The question of the relative "toxicity" of proteins of different origin has been only touched upon so far, and leaves a considerable field for future investigation.

Case Report

THE EFFECT OF MASSIVE DOSES OF DIURETIN

I. L. Nascher, M.D. New York

(*Therapeutic Gazette, June 6, 1915, p. 530-1.*)

Woman, aged 65, with arteriosclerosis, chronic interstitial nephritis, aortic and mitral regurgitation, and uterine fibroid, had edema of the legs for several months, but neglected it; blood pressure 230 mm.; dyspnea; persistent dry cough. The cough, which had lasted since before New Year's, disappeared after a few doses of heroin 1/16 grain and cherry-laurel water 10 minims. From May 20th to May 28th there was a gradual diminution in the urine output, this being but 4 ounces on the 28th. The ordinary diuretics had no effect in increasing the amount of urine. On May 28th I ordered Diuretin, 7 drachms divided into 10 powders (42 grains to the dose), one powder to be given every two hours. Before she received these large doses there was extreme edema of the left leg, some edema of the right leg, edema of the vulva, and some ascites; and there was danger of uremia setting in. The urine began to flow more fully after the fourth dose. She slept eight hours between the fifth and sixth doses. Upon awakening the treatment was continued until she had taken twenty powders, 14 drachms of diuretin, in fifty hours. The dose was then reduced to half, and after 48 hours to one-quarter of the original dose, when it was given at less frequent intervals. The diuretin was discontinued on the seventh day, the urine output being then 50 ounces. The edema of the vulva has disappeared, but not the edema of the legs or the ascites. I omit other treatment, as I want to call attention here only to the large, single, and daily doses of diuretin which can be given safely. The maximal dose is stated to be 15 grains, and for the day two drachms.

Editorial

THE PRESIDENTIAL ADDRESS

In this issue appears the Presidential address delivered before the Association at its recent Annual Meeting in Halifax. Dr. Chisholm, with his dry Scotch humor, gives good counsel to the members on many subjects, which are at present demanding the careful consideration of all, medical and lay alike. He very rightly emphasized the great importance to the medical student of careful clinical teaching not only at the bedside, but in the out-patient departments of every college hospital. At the same time we cannot help regretting his belittling the importance of the study of physics, chemistry and biochemistry; those fundamental sciences which are gradually enabling us to understand in some degree the problems and hidden mysteries of life and growth, of disease and death. There should be no antagonism in a well directed medical school between the more or less didactic teaching of these basic subjects in the student's primary years, and the practical training at the bedside in the final years of college life.

THE ADDRESS IN SURGERY

In this month's issue we publish Dr. Hugh Cabot's address in Surgery, delivered at the recent meeting of the Association in Halifax, and the attention of all those of our readers who in any way are interested in surgery may well be called to this most practical and most timely discourse. The burden of Dr. Cabot's canticle is simple, and not long: it is this, that surgeons, in spite of the most painstaking preparation of field and hands and instruments, still suffer too often the mortification of seeing a clean operative wound become infected; that this unwelcome occurrence is too readily assumed to be due to the entrance of bacteria into the wound through carelessness on the part of the interne, nurse, or suture-maker; that our eyes have been glued too much upon the one party, the bacteria, to the neglect of the other party, the soil, although both parties are necessary to make the quarrel of inflammation; that after doing our best to annihilate our ancient enemy, Sir Germ, we shamefully neglect, or actually mishandle our old friend and defender, Sir Soil, who thereupon falls a victim to Sir Germ Redivivus—which is the more a tragedy in that it is unnecessary.

The ill-treatment of Sir Soil, or, abandoning this somewhat superfluous figure, "the doctrine of the prepared soil," is Dr. Cabot's theme. By this he means a soil so handled as to be "prepared" for infection, where infection would otherwise have no chance. The causes are general and local. Among the former are fear, starvation, dehydration, unsuitable anaesthetic and excessive length of operation. The latter consists in rough handling of tissues, imperfect haemostasis, mass ligatures, and in general, crude, slow work. He makes a plea, perhaps hardly needed in these days of "technique," for the "art" of surgery, not exactly the art of the ancient masters, but rather that which consists in clean, rapid, precise, and, above all, gentle work, because the lack of such "art" is that which prepares the soil for infection.

It was obviously not Dr. Cabot's intention to write a scientific address. He chose rather to deliver a message and a warning to the plain surgeon upon a subject in which message and warning are much needed. His address will be the more useful and the members of the Association have cause to thank Dr. Cabot both for the matter and the manner thereof.

A NEW OUTLOOK FOR HOSPITALS FOR THE TREATMENT OF INFECTIOUS DISEASE

Scarcely fifty years have elapsed since hospitals for the treatment of the more important infectious diseases were established with the twofold object of securing better care and treatment of those ill with infectious disease, and of preventing the further spread of such diseases in the community; thus lessening the mortality and limiting the number attacked. That much good has been done by such special hospitals is unquestioned. Nevertheless disappointment has arisen among the public supporters of these hospitals, owing to the occurrence of cases of cross-infection among the patients, and to the fact that as yet such hospitals have failed to lower to any extent the incidence of those diseases in the community; while at the same time the isolation in separate pavilions of persons suffering from the several forms of infectious disease has proved expensive and difficult. In his address at the annual meeting in Halifax, which appears in this issue, Dr. D. L. Richardson of Providence, R.I., presents a solution for some of the difficulties. He belittles the possibility of air-borne infection, and pleads for the recognition in every infectious hospital of the paramount importance of absolutely preventing contact infection. He states that by the elaboration of a careful technique of nursing the conveyance of infection from one patient to another may be prevented. By the use of this plan of nursing the possibility of treating many forms of infectious disease in one ward without developing cases of cross infection has been demonstrated, but it demands conscientious and carefully taught nurses to carry out the directions. We heartily commend Dr

Richardson's address to our readers. A hospital for the treatment of all cases of infectious diseases, such as depicted by Dr. Richardson, where patients suffering from infectious disease of all kinds can be adequately cared for without endangering one another by cross infections is a long step forward both in nursing and hospital management. Such a hospital should not be beyond the reach of any community in Canada.

CAUTION REGARDING PLURI GLANDULAR THERAPEUTICS

In the Presidential address before the Association for the study of Internal Secretions, Prof. Harvey Cushing (Journal Am. Med. Assoc., June 18, 1921) gives a timely warning against the sudden enthusiasm among many members of our profession regarding the present or possible therapeutic value of the active principles of the ductless glands, referring especially to the pituitary. Since the discovery in 1909 that certain easily recognized disorders are due to a state of pituitary insufficiency, hundreds of papers have appeared in medical journals to the effect "that we are now in the epoch of pragmatic endocrinology, and should make the most of the splendid opportunity." Pituitary extract is advocated by pharmaceutical houses in a multitude of conditions which have hitherto baffled us and if it does not suffice by itself we are recommended to try this or that combination of hormones containing the active principles of several glands. Never before has there arisen such an opportunity for poly - pharmaceutical charlatanism. Past experience with the thyroid should be a sufficient lesson that progress must be slow and that complex clinical phenomena must be laboriously disentangled; symptoms due to defective or excessive action of the gland from symptoms due to pressure on neighboring tissues, or to the perverted action of other glands. We must expect even slower progress with the pituitary than with the thyroid, for we are dealing with a more complicated structure. Of its great importance to the economy particularly in its influence upon growth and reproduction, and upon the evolutionary processes affecting many of man's racial characteristics there can be little doubt according to Sir Arthur Keith; but these speculative theories are not sufficiently defined to be employed in therapeutics.

We are still in the crude path-breaking stage of surgery, and progress is necessarily slow. We have first to learn to recognize and classify the types of pituitary disease which are unmistakable owing to the presence of tumours. We may easily be misled by experiences drawn from imperfect experiments. In furthering our knowledge of these ductless glands, not only the clinician, but the experimental zoologist, the comparative anatomist, the biochemist, the histologist, the physiologist and the pathologist have all much work to do. The physician or surgeon meanwhile, if incapable of participating in these underlying studies, must do the best he can with the recognition and classification of clinical types, and should he venture to try glandular therapy must be slow to draw conclusions, particularly when the extract of more than one gland is given at a time. We have little evidence that any of these extracts, with the exception of the thyroid, have any action when given by the mouth. The profession should earnestly discountenance the exploration of the few discoveries which have been made by those "who would recklessly under full sail plow through a fog bank in therapeutics, tooting their horns." We have made little advance in the treatment of pituitary insufficiencies comparable to what Sir William Ord and Dr. Murray accomplished for myxoedema, and we are still more in the dark as regards the results of disturbances in other glands, and how such results are best combated.

THE EMPLOYMENT OF THE ROENTGEN RAY FOR DESTRUCTION OF HYPERTROPHIED TONSILLAR TISSUE

In an interesting report from the laboratories of the Rockefeller Institute for medical research (Jour. Am. Med. Assoc.) the results of the application of the roentgen ray to hypertrophied and diseased tonsils is given to the profession. Forty-six patients were treated, ranging in age from 3½ to 45 years of age; all showing more or less hypertrophy and disease of the tonsils and surrounding tissues. The susceptibility of lymphoid tissue to the roentgen ray had been previously shown experimentally to be so much greater than the susceptibility of other tissues that by its judicious use it was hoped that these lymphoid organs might be so diminished in size that proper drainage of the crypts would follow. The patient to be treated was placed on a table in such a position that the ray entered under the angle of the jaw, and penetrated through the soft tissues to the tonsil itself. The area exposed on each side was about three square inches, the surrounding parts being covered by heavy sheet lead. The length of the exposure varied from three to seven minutes; as a rule one exposure was sufficient. No patients were treated so long as the throat showed evidence of acute infection. In all but four cases the treatment was followed by marked improvement. Distinct shrinkage of the tonsil was noted two weeks after the exposure and the process continued for about two months during which exudates disappeared, and the surface of the tonsil became smooth, pale, and of a healthy appearance. The results reported suggest the possibility of utilizing the roentgen rays for clearing the throat of an excess of this tissue. To judge by experiments on animals it should be possible to induce any degree of atrophy by repeating the roentgen ray treatments at suitable intervals. It is possible, however, that the hypertrophied condition may return after a lapse of time.

The Association

THE ANNUAL MEETING IN HALIFAX

We had hoped to be able to publish a report of the Halifax meeting in an earlier number, but for various reasons, in particular the printers' strike and lack of space, we have been unable to do so. The report will not take the usual form, as we will be compelled to omit all but a passing reference to the excellence of the programme and the splendid hospitality of our Halifax members. It is our intention to refer in the report more particularly to the business side of the meeting, and to make a plea for better support, particularly financial support, than we have had in the past. It is true that no special call has yet been sent out to the profession of Canada for stronger support of the Association. Perhaps it is true also that the profession of Canada has not realized the fact that their Association has been growing, that its needs have been increasing, and that necessarily more money has been required to carry on its work. It is to be hoped that our members will read this report carefully and that they will realize the necessity of rallying to the support of the Association, so that we may have in Canada a national Association which shall attain the objects so well set forth in the report of the Reorganization Committee, which follows.

The business transacted at Halifax was of exceptional importance, though perhaps it was hurriedly done owing to the arrangements of the programme. The financial report submitted by the Secretary-Treasurer showed that the Association requires the sum of $13,200.00 to wipe out its present debt. This amount is made up as follows:

To the Montreal Medical Journal Company	$5,000.00
To the Murray Printing Co. (balance Morang transfer)	3,650.00
To the Macmillan Co. (balance Can. Med. monthly)	700.00
Overdraft at the bank (June 30th)	3,850.00
Total	$12,200.00

Perhaps these items need some explanation: In 1911 the Montreal Medical Journal was purchased by the Association and became its official organ under its present name. The price of the Journal was $5,000.00, but as there were no funds in the Association treasury to pay cash, this amount has never been paid, while the Association has been paying 6 per cent. to the stockholders. The second item, $3,650.00, is the balance of the sum of $7,500.00, which it was agreed to pay Murray Printing Co. when it was decided to purchase the publishing rights of the Journal from the Morang Publishing Co. It will be remembered by those who attended the Quebec meeting that the Executive Council was instructed by the meeting to acquire the publishing rights of the Journal. One of the main reasons for this step was that under the contract the Morang Publishing Co. had full control of advertisements, and many of the advertisements printed in the Journal were unethical. Apart from this there were many other reasons why it was desirable that the Association should own and publish its own Journal. After negotiations lasting over several months it was decided to purchase the publishing rights from the Morang Company for the sum mentioned.

The next item, namely, $700.00, owing the Macmillan Co., is the balance of the sum of $1,200.00 which it was agreed should be paid the Macmillan Publishing Co. for the Canadian Medical Monthly. Those who attended the Vancouver meeting will remember that it was proposed there by certain members to buy out the Macmillan Company's Journal for the sum of $7,500.00. This was regarded as an extravagant sum by the committee, and no action was taken except that the Council was authorized to acquire the Medical Monthly if it could be obtained at a reasonable price. Some months later your committee was able to purchase this journal for the sum of $1,200. This is being paid off at the rate of $100.00 a month, and there still remains the sum of $700.00 to be paid.

It has for some time been apparent that the present revenue of the Association could not meet its ordinary operating expenses, and, in order to carry on, certain members of the profession in Montreal, including the members of the Executive Council, became responsible to the bank for an overdraft of $5,000.00. In this way we have been able to meet our ordinary financial obligations. This explanation will make our members familiar with our present financial position.

The report of the Secretary-Treasurer contained the following recommendation: "That steps be taken by the Association immediately to raise a fund for the purpose of discharging its present indebtedness." And at the same time he suggested that a canvass of the members be made to secure the sum required. Acting on this report, the Executive Council decided to recommend to the general meeting that a foundation fund be raised from amongst the members of the Association. The following resolution was brought forward, and duly passed at a regular business meeting:

> "WHEREAS—The report of the Executive Committee of the Canadian Medical Association shows outstanding liabilities of approximately $10,000.00, and
>
> "WHEREAS—It is the unanimous opinion of the Council that it would be in the best interests of the Association that these liabilities be retired in order that your Association may not be hampered in the carrying out of its many activities, and
>
> "WHEREAS—These liabilities can be retired and additional funds made available for the projection of the work of the Association, if the members will co-operate.
>
> "THEREFORE BE IT RESOLVED—That a bond issue be floated among our members for the sum of $20,000.00. Each bond to be in the denomination of $100.00, bearing interest at 5 per cent. per annum for a term of 10 years, dating from October 1st, 1921. These bonds may be redeemed at par by lot by the Association at any annual interest date whenever sufficient surplus funds are available for the purpose.
>
> "FURTHER BE IT RESOLVED—That a committee of one member from each province—with power to add—be appointed at this meeting to secure subscription to the bonds in the respective provinces."

In putting forward this resolution the Executive Council made an appeal to the members to subscribe at once to the proposed bond issue, and lists were circulated at the meeting. As a result of this appeal some 50 members agreed to subscribe to the bond issue. This was very gratifying to the members of the Council, and it was felt that there should not be the slightest difficulty in acquiring the entire amount of $20,000.00. The work of canvassing the members was left in the hands of a committee consisting of one member in each province. This committee is made up as follows Alberta, Dr. Allin; British Columbia, Dr. M. T. McEachern; Ontario, Dr. Routley; Quebec, Dr. Reilly; Manitoba, Dr. Maclean; New Brunswick, Dr. Veniot; Saskatchewan, Dr. McLeod; Nova Scotia, Dr. Mackenzie. The active canvass in each province will be undertaken by these gentlemen, and it is hoped that our members will respond liberally.

Although the placing of the Association on a sound financial basis is of great importance, a still more important matter is the entire reorganizing of the Association. At the Vancouver meeting it will be remembered that a committee was appointed to bring in a report on the subject of reorganization. The report submitted by this committee at the Halifax meeting was most complete, and the Chairman, Dr. Geo. Bingham; the Secretary, Dr. J. S. McEachern, and the other members are deserving of the highest praise. We publish the report below as it was adopted at the Halifax meeting.

Other features of the meeting will not be commented on at this time. Many important resolutions were adopted, but these will be reserved for a later number. A short report on the Museum exhibit is appended.

REPORT OF REORGANIZATION COMMITTEE

The following is submitted as a sketch of the proposed plan of reorganization of the C.M.A.

It presupposes a reasonable degree of business-like organization to exist in each province. The fundamental principle underlying it is, that there must be the closest co-operation between the various Provincial Associations and the C.M.A.

Under the proposed plan there are certain obligations which each association—Provincial and C.M.A.—must undertake to fulfill. The obligations in detail would be:

1. Obligation of Provincial Association:
   Each Provincial Association (a) Will make the Journal of the Canadian Medical Association its official organ and give it undivided support. It will appoint a provincial sub-editorial committee to which will be entrusted the task of collecting scientific papers and case reports presented by members of the profession resident in the province. The committee will then select those articles which it deems worthy of publication in the Journal and forward copies of them to the Editor of the Journal. The final decision as to the suitability for publication of any submitted will rest with the Central Editorial Board or with the Editor-in-Chief.

(b) As soon as the organization in the province is available will collect from each of its members a composite fee sufficient to cover membership in the Provincial Association and the Canadian Medical Association. The sum of $10.00 per member will be forwarded to the Canadian Medical Association to cover the cost of membership in that organization. In the meantime and until the provinces are ready to collect the composite fee the annual fee for the Canadian Medical Association shall be increased to $10.00, beginning January, 1922.

(c) Will undertake to keep the Business Executive of the Canadian Medical Association informed as to all new legislation affecting the profession in that province and the steps being taken by the Provincial Association to urge it, or combat it, as the case may be.

(d) Will provide the Executive Committee of the Canadian Medical Association from time to time any information which it may deem to be of use to the whole membership of the Canadian Medical Association.

The obligations of the Canadian Medical Association are outlined as follows:

The Executive Committee shall be constituted as at present with the addition of two representatives elected by the Provincial Association of each province. The President and Secretary of the Canadian Medical Association shall be ex-officio members of the Executive Committee.

It is advisable to endeavor to have all provincial organizations elect their officers to hold office for the calendar year so as to overcome the possibility of changing the representatives during the course of the year.

Powers and functions of Executive Committee of Canadian Medical Association:

(1) The Executive Committee shall be responsible for all business throughout the year.

(2) They shall have power to appoint a paid full-time associate Secretary and any other clerical assistants which may be required, for the proper conduct of their work.

(3) They shall arrange to conduct a systematic and continuous campaign through the lay press to educate the public, with regard to questions of health, sanitation, recognition of early signs of diseased conditions, the progress of Medical Science, the lack of scientific training of members of various cults which pretend to heal by irregular means, and any other subject which from time to time they may deem in the interest of the public, and the Medical Profession should be given publicity. For this purpose they shall have authority to select a staff of contributors, both lay and medical, to prepare articles along the lines indicated. They shall appoint a board of censors (Medical) who shall review all such articles before they are submitted to the press, so as to eliminate any statements which may not be orthodox or be recognized as sound, in the light of present day medical knowledge.

(4) They shall provide for the maintenance of a Bureau of Information at the Head Office of the Canadian Medical Association. This Bureau with the co-operation of the various Provincial Executives, will undertake to keep available full information regarding all legislation in each Province of Canada, which affects the profession, also information regarding the measures which were adopted by the profession in any Province to secure legislation favorable to, and to combat legislation adverse to, the interest of the profession in that particular Province. This Bureau will also undertake to provide, on the request of individual members of the profession information supplied to it by the various Provincial Executives relating to suitable locations for medical men in the various Provinces of Canada.

(5) The Executive Committee will from time to time be responsible for the carrying out of investigations or enterprises which it may be directed to undertake by a general meeting of the Canadian Medical Association.

(6) The Executive Committee will meet at any time during the year if important questions demand that a meeting be held. The travelling expenses of the members may be defrayed from the funds of the Canadian Medical Association.

(7) The Executive Committee will be responsible for the making of such arrangements as will ensure the Journal of the Canadian Medical Association being brought up to the highest possible state of efficiency, in the interest of the whole profession of Canada.

THE MUSEUM OF THE ASSOCIATION MEETING AT HALIFAX

One of the interesting features of the Convention was its splendid museum of scientific exhibits, set up in the Physics Laboratory of Dalhousie University in direct contiguity to the section of medicine and surgery. The local committee, represented by Prof. A. G Nicholls, had spared no pains to bring together a representative collection, which had been arranged in an attractive manner under the direction of Drs. Maude E. Abbott, W. W. Beattie and H. N. Segall, of the McGill Pathological Museum, and Mr. Walker of Alberta University.

The University Exhibits consisted of some one hundred and fifty pathological specimens, of which about seventy were contributed by Toronto, Queen's and Dalhousie, and the balance by the Pathological Museum of McGill. It was arranged in two sections (a) miscellaneous specimens, which included a very fine obstetrical and gynaecological series; brain tumours, kidney and liver conditions, and (b) specimens for the illustration of papers on the programme. Under the latter heading were grouped a number of specimens which presented a consecutive study of the lesions referred to in the papers, and as such elicited much interest; among these the collection contributed by Dr. L. M. Murray of Toronto on "Sub-acute Bacterial Endocarditis" was noteworthy; also the several series of specimens illustrating Cardiac Embolism and Thrombosis in Mitral Stenosis; Gastric Ulcer; Surgical Conditions of the Stomach and Duodenum and the Septic Uterus.

The Canadian Army Medical Museum contributed a large exhibit sent by special permission of the Director-General of Medical Services, from the National collection now in course of preparation at the Medical Museum of McGill Univeristy. It comprises a number of color preparations of gunshot wounds, gas gangrene, gassed lungs with sequelae; other injuries of moist tissue, a unique series of war traumata of bone collected and prepared in the field by Major L. J. Rhea; also reproductions of water-color drawings of Canadian Army Medical arrangements at the front, and with models for field sanitation by Major R. St. J. MacDonald. There were also on exhibition photographs, water-colors and charts illustrating recent advances in facial surgery; also traumatic lesions of the eye, and injuries of the thorax, the latter from a collection made by Col. Norman B. Gwyn of Toronto. This war exhibit was greatly appreciated by the members of the Association and was made the subject of a special resolution to the Canadian Government.

Two pathological sessions were held in the museum under the chairmanship of Prof. A. G. Nichols at which all specimens of interest in the University exhibit and the Canadian Army Medical Museum were demonstrated by the exhibitors and discussed by the contributors to the programme.

CANADIAN MEDICAL ASSOCIATION

Statement of Receipts and Disbursements for Year

Ending 31st December, 1920

RECEIPTS

Balance in bank, Jan. 1st, 1920....		$ 317.75
Annual Fees—		
Paid direct	$ 5,392.09	
Paid by draft	3,968.70	
		9,360.79
Advertisements		4,951.48
Reprints		841.17
Sundries		176.93
Overdraft in bank, Dec. 31st, 1920.		17.02
		$15,665.14

DISBURSEMENTS

Refunds paid Provincial Societies—		
Alberta	$ 100.00	
British Columbia	35.00	
Manitoba	50.50	
New Brunswick	30.00	
Nova Scotia	27.00	
Saskatchewan	23.50	
		$ 266.00
Journal Account—		
Printing	6,918.95	
Illustrations	387.10	
Murray Printing Co. on a/c Morang	1,200.00	
Agents' Commission	1,080.46	
		9,586.51
Reprints		592.34
Montreal Medical Journal Co.— Payments to stockholders $5,000.00 at 6%		300.00
General Expenses—		
Auditors' Fees	$ 35.00	
Bonus (Sec'y-Treas.) two years.	300.00	
Postage	230.00	
Salaries	2,480.50	
Stationery and Printing	310.16	
Sundries, Telephone, etc.	242.97	
Travelling Expenses	144.96	
Advances to Associated Secretary	100.00	
		3,843.59
Vancouver Meeting—		
Travelling expense	$ 585.60	
Share of general expenses	491.10	
		1,076.70
		$15,665.14

VERIFIED, subject to our report of this date.
McDONALD, CURRIE & CO.,
Montreal, 9th June, 1921. Chartered Accountants.

Abstracts from Current Literature

CORRECTION

We regret to announce that in the first paragraph on Page 588 in our August number, an error has occurred. The sentence appearing "Subsequent to this, 'treatments are repeated at intervals of one month, etc.' " should read "Subsequent to this, 'blood examinations are repeated at intervals of one month, etc., etc.' "

Apologies are offered to the author for this mistake.

MEDICINE

The Absence of Pancreatic Secretions in Sprue, and the Employment of Pancreatic Extract in the Treatment of this Disease. Brown, Thomas R.: Amer. Jour. Med. Sci., Apr., 1921, Vol. 161, p. 501.

The writer calls attention to the absence of the pancreatic secretion in sprue.

Sprue has been defined by Castillani and Chalmers as "A chronic catarrhal inflammation of the alimentary canal of unknown cause characterized by a peculiar ulcerative condition of the tongue and mouth, and by the passage of large, pale, smooth motions, the symptoms waxing and waning periodically."

In the stool and in the duodenal contents Brown found all the pancreatic ferments absent, and on this basis treated five cases by the administration of 5 to 10 grains of pancreatin and 20 to 40 grains of calceum carbonate three times daily. In four of the cases remarkable improvement occurred, and in one case no improvement was noted.

In addition to the pancreatin the usual dietetic measures were carried out.

The pancreatic deficiency is not regarded as necessarily the cause of the disease, but as a probable cause of some of its symptoms.

A. H. GORDON.

The Use of Diet in the Treatment of Arthritis. Pemberton, Ralph: Amer. Jour. Med. Sci., Vol. 141, p. 517.

This writer summarizes certain views with reference to the dietetic treatment of arthritis. Following the view that arthritis may be the reaction to diminished oxidation in the body resulting from the stress of a focal infection, the lightening of the metabolic load by a fairly sharp reduction in the caloric intake has been found of definite value in the amelioration of the arthritic symptoms.

Pemberton emphasizes the care required in gauging the food reduction and the necessity of accurate observation of its effects, but gives a most encouraging outlook upon the value of this therapeutic method.

A. H. GORDON.

SURGERY

Chemical Influence of the Active Constituents of the Ductless Glands. Kendall, E. C.: Surg. Gyn. and Obst., March, 1921, Vol. 32, p. 205.

Up to the present the active constituents of only two glands have been isolated. Epinephrin was isolated from the adrenal medulla in 1901. It possesses a definite chemical composition and has been made synthetically. When administered it has an immediate effect on blood pressure and a rise in the metabolic rate. The duration of its action is very short. Recently thyroxin has been identified as the active agent of the thyroid gland. The injection of this substance will bring about all the changes in the thyroid-deficient individual that are brought about by dessicated thyroid. It contains about 65 per cent. of iodine. The physiological dose is from 1/50 to 1/75 milligram per kilo of body weight. Yet one thousand times as much as this was administered intravenously to a small dog with only a slight passing effect. It was found that the tissues would absorb only a certain amount, the balance being excreted before it had time to function. Typical symptoms of hyperthyroidism are produced by the persistent administration of thyroxin.

GEO. A. FLEET.

The Treatment of Congenital Hypertrophic Stenosis of the Pylorus by Rammstedt's Operation. Ramsay, R. A.: Brit. J. of Surg., April, 1921, Vol. 8, p. 397.

Although the etiology of congenital hypertrophic stenosis of the pyloris is still obscure, several probable theories have been advanced. The writer recognizes the possibility of successful non-operative treatment. This consisted in regular stomach lavages, associated with feeding of small quantities at frequent intervals. Recently two new methods have been described. One consists in giving thick foods. The other advises the use of large doses of atropine in the food to inhibit the action of the sphincter.

Medical treatment is the ideal method, when this is possible, as the patients are very poor operative risks.

If a child does not show some immediate response to the treatment, judged by a relief of the vomiting and a gain in weight, it should at once be discontinued and surgical measures adopted. The author reviews several operations for the relief of the symptoms, but considers Rammstedt's method the most satisfactory. This consists in dividing the hypertrophied muscular coat in the axis of the pyloric canal, leaving the mucous membrane intact and using no sutures to close the gap.

Deep ether anaesthesia is advised to prevent shock. Before starting the anaesthetic, the stomach should be washed out with a solution of bicarbonate of soda.

Certain important complications in the postoperative period may occur, such as, shock, haemorrhage, peritonitis, diarrhoea and postoperative fever, any of which may prove fatal.

GEO. A. FLEET.

The Protection of the Patient in Surgery of the Thyroid. Crile, Geo. W.: Surg. Gyn. and Obst., March, 1921, Vol. 32, p. 213.

The patient must be protected against the psychic stimuli of fear and worry before, during and after the operation. All operative arrangements must be kept from the sight of the patient. In extreme cases inhalation anaesthetics, especially ether, are contra indicated owing to their production of suboxidation. Gas and oxygen analgesia, combined with local anaesthesia, is entirely free from this serious objection. Myocarditis may also produce the same condition. 30 minims of the tincture of digitalis every four hours for 15 doses may relieve the symptoms. Water in large quantities is absolutely essential, either by mouth or subcutaneously. Some investigators suggest giving 2 grains of thyroid extract the evening before and 2 grains on the morning of the operation to counteract a too sudden withdrawal of thyroid activity. In extreme cases the wound may be left open to prevent the absorption of wound secretions. Ice is used freely to overcome the so-called post operative hyperthyroidism. When the temperature rises to 103 ice packs are resorted to.

GEO. A. FLEET.

The Differentiation of Saphenous Varix from Femoral Hernia. Stetten DeWitt: Surg. Gyn. and Obst., March, 1921, Vol. 32, p. 235.

Owing to the frequency with which dilatations of the upper end of the saphenous vein are confused with femoral hernia, the author points out the main points in the differential diagnosis.

In varix the swelling is usually somewhat lower down; other varicose veins will usually be seen; reduction of the tumour and pressure over the femoral ring by the examining finger does not present a reappearance of the tumour when the patient stands up; when the patient coughs one does not get a frank impulse, but a fluid wave or thrill; where there is a small amount of subcutaneous tissue, a bluish sheen to the skin over the swelling is usually seen.

GEO. A. FLEET.

Carcinoma of the Large Intestine. Stutton, J. Lionel: Brit. M. J., April 16, 1921, p. 555.

Too much time should not be lost trying to arrive at a certain diagnosis of carcinoma of the large intestine because such progress is made by the disease that one soon finds that little can be done by operation. A history of abdominal pain associated with irregularity of the bowels persisting for twelve months is considered sufficient cause for an exploratory operation.

Operations on the large bowel for carcinoma, if performed within one year of commencement of the new growth, permit of a favorable prognosis.

Methods of treatment: Operate early and freely, and remove at least four inches of bowel on each side of the growth together with the mesentery and lymphatic glands. Short circuit when possible, for growths which cannot be removed by operation.

A. ROSS.

The Indications for Cholecystectomy. Monsarrat, K. W.: Brit. M. J., March 12, 1921, p. 37.

The author considers his subject from physiological, pathological, and clinical standpoints.

Physiologically he concludes that the gall bladder is of no particular functional value in the human organism.

Pathologically he points out that the gall bladder is a diverticulum with a very narrow neck and that its contents tend to stagnate. This is most important inasmuch as bile and mucus, the normal content of the gall bladder, is a favorable medium for bacterial growth. Bacteria reach the gall bladder through the portal circulation and set up a cholecystitis.

Inflammation of the gall bladder so changes the constituents of the bile that cholesterin is thrown out of solution and forms the nidus for biliary calculi. For anatomical and pathological reasons he believes that a gall bladder which has once been the seat of an inflamatory process, will always remain a menace to good health, unless removed at operation.

Clinically this is borne out by the great number of patients who suffer persistent ill-health following cholecystostomy, due to chronic cholangeitis, chronic pancreatitis, recurrent attacks of pain and tenderness in the region of the wound, and gastric disturbances due to adhesions.

Cholecystostomy should be performed only when the patient's age or feebleness demands the shorter and easier operation.

Drainage is necessary only when there is an associated pancreatitis, and then a rubber tube draining the common duct is all that is required.

A. ROSS.

Scoliosis. Kleinberg, S.: Surg. Gyn. and Obst., April, 1921.

This is a plea for the early treatment of organic scoliosis by plaster jackets, rather than by exercises. It should be instituted as soon as the curvature is discovered, and should be carried on uninterruptedly for years until improvement has been obtained and until such time as will reasonably assure arrest of the deformity.

Application of the jacket with the patient partly suspended is described and illustrated. Over correction, or as much correction as possible, is obtained by side pulls, the body not being flexed as in the Abbott method. Jacket should be renewed constantly every 1-2 months. A large pad is inserted in the hollow side of the trunk, to be removed after the plaster has hardened. During change of jackets there must be no opportunity for relapse of the deformity.

J. A. NUTTER.

The Orthopaedic Treatment of Poliomyelitis. Fairbank, H. A. T.: Brit. M. J., April 9, 1921, p. 517.

The stages of the disease are described, rest and the prevention of deformity being insisted upon. All reconstructive surgery is to be delayed until the third stage begins two years after the onset, by which time spontaneous recovery is usually not to be expected. The importance of guarding a weakened muscle against overstretching is emphasized, and credit is given to Sir Robert Jones for this important factor in the treatment of poliomyelitis. Massage is regarded with favor, electricity with doubt as to its usefulness. Splints to combat various deformities are described. Tendon transplantation and arthrodesis are discussed, the latter never to be done before the age of nine years.

The Whitman operation of astragalectomy is spoken of with favor, silk ligament with disfavor.

In regard to the operative treatment of paralytic scoliosis it is stated that more work is being done in the United States and in Canada than in England.

J. A. NUTTER.

Congenital Torticollis. Meyerding, H. W.: Am. J. of Orothop. Surg., March, 1921.

Twenty-six cases are reported. The character deformity is described, the head of the affected side, the chin towards the opposite shoulder, with scoliosis and facial asymmetry. Etiology is trauma to sternomastoid at or preceding birth, producing ischaemia, and chronic interstitial myositis, the affected portion of the muscle becoming hard and cord-like. The differential diagnosis of Pott's disease, infection with myositis and perispondylitis, spasmodic torticollis, fracture and syphilis are discussed. Congenital deformity of the spine should always be borne in mind in order that an accurate prognosis may be made.

The treatment is to divide all contracted structures and put the head up in an over corrected position for 1 to 3 months in plaster of Paris. The fixation needs correction until the scar shows no tendency to contract. Results are good, though in adults and older children facial asymmetry will persist.

J. A. NUTTER.

Surgery of the Spleen. Moynihan, Sir Berkeley: Lancet, Jan. 22, 1921, p. 157.

This article, which is a partial report of the Bradshaw lecture, is the most complete review of the surgery of the spleen which has come out in recent literature. It covers six full pages in the Lancet, and the subject of pathology of the spleen, the association of it with that of the liver, and the treatment of various anæmias, are fully discussed. The pathology of disease of the spleen is necessarily bound up with the physiology and pathology of the liver. The pathology of the spleen cannot be separated from (a) the way the liver handles the end products of splenic disease, and (b) pathological results produced in the liver cells thereby.

It is known that toxins or infective organisms may act (1) on the floating blood cells, or (2) carried with the blood stream may selectively attack certain tissues. This has been well shown by Rosenow. Such toxins in the blood stream may in the spleen cause (a) degeneration, (b) excite the spleen cells to over-activity. As a result we have both the toxin and the products of splenic degeneration and the products of over-activity all to be considered where the spleen is so influenced. It is known that the blood from the spleen first meets with the blood from the stomach and from the tail of the pancreas and in the liver is first brought into contact with the Kupffer star cells and the endothelial cells of the hepatic sinusoid or the liver cell itself. Then we get degeneration and re-active (cirrhotic) changes. Toxins may go through the liver cell without altering it to the biliary channels, and, acting on the bile, cause lessened bile fluidity with precipitaton and obstructive jaundice. In the spleen toxins may cause anæmia by producing hæmolysis as well as by producing secondary fibrosis of the organ, cirrhosis of the liver, or may actuate certain cells and produce one of the leukæmias, myeloid type. In the study of the production of anæmia we have to deal with the active poisons which produce anæmia (1) by interfering with red cell formation, (2) hæmolytic poisons which destroy red cells or render them sensitized, more friable, and more easily destroyed, (3) toxins which produce fibrosis, and (4) poisons which excite cell proliferation, thus affecting the Malpighian body and causing lymphatic leukæmia and Hodgkin's disease. Toxins affecting the spleen may cause anæmia by interference with the production or destruction of the red cells or interference with the proper ingestion by the liver of the iron carrying broken-down cells from the spleen. These iron-laden endothelial cells from the spleen are too large to pass through the minute capillaries in the liver. They alone supply iron in its needed form and apparently only from the spleen are such cells brought to the liver. In splenic anæmia the liver cells themselves are not injured. In hæmolytic splenomegaly the hepatic cells are injured and we commonly get toxins passing through into the bile channels with cholecystitis, cholelithiasis, etc. Other signs of splenic disease besides anæmia are jaundice, produced as explained above, petechial hæmorrhages due to "endotheliotoxin," muscular weakness with wasting, pyrexia, splenomegaly, leucocytosis, and hæmorrhagic conditions. The spleen is of largest size in Gaucher's disease, next in leukæmia, then in malaria, and sometimes enlarges in pernicious anæmia. In pernicious anæmia we find a low white cell count because of the poisons acting on the bone marrow. On the other hand, in hæmolytic jaundice there is usually an increase of leucocytes as we get bone marrow stimulation. The results of splenectomy in pernicious anæmia show that there is a definite increase in the length of time that patients survive after splenectomy over those not so treated. In the cases quoted in the Mayo Clinic, up to September 20th, 1920, twenty-two per cent. lived two and one-half times as long as the average. There were 53 cases with three deaths. Five were living four to five years after splenectomy, and eleven were living three to four years later. Percy found in operative cases that there were infective foci present in 95 per cent. of these cases. Bacteria were grown from three of the nine spleens removed, four of the seven gallbladders, and six of the seven appendices. In 20 of 24 cases there were cholecystitis. Hæmolytic streptococci were found in seven cases, B-coli in five cases, and the streptococci viridans in four cases. Moynihan states that in leukæmia radium produces astonishing effects upon the spleen. X-rays over the spleen also cause a very marked diminution in size. Benzol is a very valuable product associated with either x-rays or radium. Splenectomy is advised only in selected cases.

Splenic anæmia shows three distinct stages, (a) enlargement of spleen with secondary anæmia, three to twelve years, (b) gradual liver enlargement and decrease of urine secreted—for a brief period, (c) shrinkage of liver and ascites, one to two years. In this disease, splenectomy, if done early, cures. In the Mayo

Clinic there were 73 operations with nine deaths. It is to be noted that in splenic anæmia the red cells do not show fragility, there is leucopænia and there is always splenic enlargement.

Hæmolytic jaundice may be acquired or congenital. In the acquired form there is acholuric jaundice, enlargement of the spleen and anæmia, often of a very rapid production. Red cells may fall to 1,000,000 in a few weeks. There is an increase in the number of reticulated cells and there is an increased fragility.

Summary—Splenectomy is advised in Banti's disease, that is splenic anæmia, hæmolytic jaundice, occasionally in cases of pernicious anæmia which have been built up by "step-ladder" transfusions of whole blood, possibly in some cases of leukæmia. The removal of the spleen for injuries is apparently without any definite permanent effect on the organism, and its removal in these stated diseases is apparently the removal of the chief, if not the only, cause of the disease.

The paper is well worth study by not only surgeons, whose attention is arrested by its title, but by internists, hæmatologists and pathologists.

C. K. P. HENRY.

RADIOLOGY

Cardiospasm. Butler: Am. J. Roentgenol., Oct., 1920, p. 478.

The paper is illustrated by a case of congenital cardiospasm in a man of 34, and reference is made to a very thorough paper on the subject, in which 63 cases are reported, by Smithies, in the Journal of Roentgenology, 1919, ii. Dr. Butler concludes that "Roentgen examination gives a typical picture; dilated oesophagus, perfectly smooth in contour, coming down to a point at its lower end, and long retained barium. In carcinoma there is little dilatation above the obstruction because of the rigid, infiltrated walls, and the outline at the constriction is ragged; in addition the carcinomatous obstruction passes only fluids, while the cardiospasm takes solids better. The spasm may be intensified by the use of irritating substances, as ground pineapple,or by very cold drinks, and may often be relieved by atropine. Stricture following trauma rarely is seen so low down, and, furthermore, has a definite history. Syphilis, of course, may imitate every condition, but is very rare in this location and also offers other positive diagnosis."

J. D. MORGAN.

Inflation of the Colon as an Aid in Roentgen Examinations. Phillips, H. B.: Surg. Gyn. and Obst., Nov., 1920.

Philips describes how the borders of a large hypernephroma (left) were clearly outlined by distending the colon with air by means of a bicycle bump attached to a rectal tube which had been inserted into the colon, the patient lying on his left side. He concludes that "This method does not offer as universal an application as oxygen inflation of the peritoneum." It is, however, expeditious, and is free from dangers and inconveniences.

J. D. MORGAN.

Injection of Bile Ducts with Barium. Beall, F. C., and Jagoda, S.: J. A. M. A., May 28th, 1921, p. 1483.

Report of a case.—A woman, aged 42, past history negative. Present trouble began with pain in epigastrium, intermittent in character, and not related to the taking of food. She had nausea and vomiting. Fever was present with chills. No jaundice. A barium meal examination showed a normal stomach. Six hours later the stomach was empty, the duodenum outlined, and above the duodenum irregular branched projections of the barium. More barium was given and another skiagram made (reproduced with the report). It shows what seems to be an injection of the bile ducts with barium.

At operation the stomach and duodenum apparently were normal, and the gall bladder and ducts were normal in appearance. The pancreas was felt as a hard, enlarged mass behind the stomach. A diagnosis of acute pancreatitis, with abscess and insufficiency of the papilla of Vater was made. The patient eventually died. Necropsy was refused.

The writers offer the suggestion that the frequent vomiting was what forced the barium into the bile ducts.

They conclude: "Might it not, then, be possible that many patients with a similar condition are roentgenographed and the condition not discovered because the vomiting is not present to force the barium into the ducts? And if an insufficiency of the papilla of Vater should prove to be of common occurrence, might we not have to reconstruct our ideas of the etiology of acute pancreatitis?

J. D. MORGAN.

Instantaneous Radiographs of the Human Heart. Eyster and Meek: Am. J. Roentgenol., Oct., 1920.

The paper is summarized by the authors

thus: "A method is described for making rapid x-ray shadowgraphs of the human heart with a casette-changing mechanism allowing two exposures within the same cardiac cycle. By recording a simultaneous electrocardiogram the exact incidence of these exposures in the cardiac cycle is determined, and their position may be quite accurately chosen by listening to the heart sounds and closing a key by hand. The changes in shape and size of the normal human heart during its cycle are described, so far as we feel justified, on the basis of observations made up to the present time. The more important points that we feel are evident at present are the following: (1) The movement of no single border of the heart is an accurate index of the extent of its contraction. The whole outline is necessary for such estimation. (2) The mechanism of ventricular filling would seem to be very similar to that which physiological experimentation has established as being present in the dog, especially in that the major part of ventricular filling occurs shortly after the ventricle goes into relaxation and is in large part completed before the subsequent auricular contraction, systole of this chamber playing little role in adding blood to the ventricles."

J. D. MORGAN.

Organ Stimulation by the Roentgen Ray. Petersen and Saelhof: J. A. M. A., March 12th, 1921, p. 718.

Heretofore the x-rays have been almost exclusively used in therapeutics for their destructive effect. It is a biological aphorism that agents which in large doses are toxic to cells act as a stimulant in small doses.

In the present instance the writers refer to the stimulation of metabolic processes rather than to reproductive stimulation.

Experiments were done with dogs. Cannulae were inserted into the common bile duct and into both ureters. In each case considerable increase was noted in the volume of secretion following x-ray stimulation as compared with the volume obtained during a similar period before stimulation. In another dog a partial resection of the pancreas was performed. It was observed that the only time that this animal was sugar free was two days after x-ray stimulation. From the clinical observations now in progress the impression has been gained that by means of such roentgen ray stimulation a method of decided usefulness is offered in the treatment of diabetes.

Fraenkel has recently called attention to the irradiation of the ovaries in certain forms of dysmenorrhoea, irradiation of the thymus and hypophysis in osteomalacia, irradiation of the periosteum to facilitate the healing of fractures, irradiation of the epiphyses of bones and the hypophysis of children to promote growth, and the irradiation of the spleen and bone marrow in pernicious anaemia, the spleen in tuberculosis, etc. A second effect of organ stimulation has been noted, namely, the discharge from the cells of certain substances which act on remote pathological lesions.

Hektoen has endeavored to increase antibody production by irradiating various organs, while the authors have shown that it is impossible to mobilize enzymes after irradiating various organ complexes.

J. D. MORGAN.

An Aid to the Diagnosis of Tumor of the Urinary Bladder. Melen: J. A. M. A., March 19th, 1921, p. 782.

The author suggests that one should take an air cystogram first, then fill the bladder with sodium bromide solution, either 15 per cent. or 25 per cent., and take a second picture, and, lastly, take an immediate picture after emptying the bladder. By this latter manoeuvre it is sometimes possible to demonstrate filling defects of the bladder wall, which are not demonstrated by the two former methods.

J. D. MORGAN.

Personal Experience with the Application of the newer Roentgentherapy in Cancer. Sittenfield, M. J.: Am. J. Roentgenol, May, 1921, Vol. 8, p. 232.

The fact that recent advances in the technique of deep radiotherapy have been accomplished abroad makes it apparent that the older methods were found wanting. Insufficient penetration of hard rays to the deeper tissues, lack of measurement for practical purposes and the lack of knowledge of the exact dose necessary to influence a malignant tumour were a few of the shortcomings.

Some of these obstacles have been overcome by the construction of more powerful apparatus and of tubes to tolerate higher intensities as well as the development of means to determine the dose necessary to destroy new growth.

The author reports three cases with excellent results. The focal distance employed was 50 cm. and the portals of entry 15 x 18 cm., the rays being filtered through 0.5 mm. of zinc plus 1 mm. of aluminum. The duration of the treatment was two hours each day for four consecutive days, instead of one session of eight hours as in Bumm's Clinic. The use of radium was employed with the x-ray treatments. It is the opinion of the author that intensive radiation for short periods is much more effective than smaller doses for long periods. With small doses frequently repeated the period of latency is considerably protracted, and, furthermore, cumulative effects may be experienced producing chronic changes which are not at all desirable. Stress is laid upon the advisability of administering the entire lethal dose at one sitting. When the condition of the patient or the danger of absorption toxaemia may not permit of this, all efforts should be directed to administering a full dose within one week.

It is most essential that sufficient intensive roentgen or radium rays be administered to affect completely all parts of the cancer without damaging or destroying healthy tissue. If any one part of the tumour receives a sub-lethal dose failure and recurrence is sure to follow. To effect the most favorable radiation to the deeper tissues, proper filtration, increase in the focal distance and increase in the size of the portals of entry must be made use of.

W. A. WILKINS.

CHILD WELFARE

The Carnegie United Kingdom Trust of Great Britain has voted $200,000 to the Central Council of Infant and Child Welfare towards the establishment of a Central Child Welfare Institute in London, which will link up the various national organizations engaged in child welfare, and will co-ordinate the great body of voluntary effort, and thus become the central organization in the United Kingdom.

A new experiment for the further reduction of infant mortality is being made in Huddersfield. It adopts the principle of keeping mother and baby at home and there helping them. The scheme provides for adequate supervision of every child for the first year of life, and the provision of health services to mother and baby. A weekly visit for the first month, with bi-monthly visitations thereafter, is a feature of this community endeavor.

The State Health Department of Philadelphia suggests that women be trained in the cleaning of teeth ("Dental Hygienists") and that they afford a semi-annual attention to all the scholars in the State; in addition to carrying on a prophylactic campaign. Not alone would health be conserved, but scholarship would be improved under this plan. An "Automobile Dental Dispensary" is operating through the rural districts under the State Board of Health engaged in dental treatment and phophylaxis.

A municipal milk plant is being established at Jamestown, N.Y., under civic subsidization of $150,000, whereby a modern pasteurizing plant will be erected and milk distributed to the community on a cost basis.

A Child Health Train, on the 10th of August commenced a tour of the Province of Quebec, consisting of two railroad coaches suitably equipped to carry the professional staff of at least seven Child Welfare Workers who will demonstrate Child Health possibilities in Quebec Province. One car will be entirely devoted to exhibits, demonstrations, etc., in both English and French, while the second coach will be the living quarters of the staff, as well as conference quarters. Activities will include examinations, demonstrations, lectures, exhibits and distribution of literature, along with motion pictures along health lines. Babies and children up to the age of 14 years will be physically examined; parents will be advised as to the condition of their children and instructed in the rudiments of child health. This work will be conducted on a gratuitous basis at the various points to be visited.

News Items

QUEBEC

Massage Association Aims at High Standard

The Canadian Association of Massage and Remedial Gymnastics, the incorporation of which in March, 1920, marked an important step towards the full recognition of the value of massage and remedial gymnastics, has already advanced appreciably towards the realization of its aims. These include the improvement of the status of those engaged in the practice of the profession under medical supervision; the maintenance of a uniformly high standard in the Dominion through the annual appointment of an examining board; the establishment of a uniform curriculum of studies and the offering of courses qualifying students for full membership; the promotion of active co-operation with the medical profession, hospitals and universities of Canada; and the establishment of registries of trained workers, available to medical practitioners and to the general public.

The membership of the association now exceeds eighty, and is representative of all parts of the Dominion. Two local branches have been formed in Toronto and Montreal, and in each of these cities registries have been established. The association has offered to Hart House graduates and others qualified for military work two post-graduate courses, giving the necessary training for civilian practice, which admitted to full membership in the Dominion association. Similar courses will be offered in the future in various Canadian centres, those selected being the points most convenient to the largest number of students wishing to make use of the course. Every encouragement is offered by the association to its members to improve their qualifications through the special lectures and post-graduate work which it promotes from time to time.

The headquarters of the Dominion association are in Montreal. The Advisory Committee, which will shortly be appointed, will consist of prominent medical men and members of other professions from all over Canada. The present officers are as follows: Hon. President, Dr. F. W. Harvey, Montreal; President, Miss E. M. Cartwright, Montreal; Vice-President, Mr. D. J. McDougall, Toronto; Secretary-Treasurer, Miss L. J. Longworth, 74A St. Famille street, Montreal. Board of Directors. Miss E. B. Asplet, Miss E. M. Cartwright, Miss E. M. Fisher, Mrs. N. S. Hay, Montreal; Mr. D. J. McDougall, Mr. R. A. Holmes, Miss M. Potts, Mrs. Bruce Robertson, Miss E. H. Turner, Toronto. Executive Committee, Mrs Bruce Robertson, Miss A. McLaughlin, Toronto; Miss Asplet, Miss Fisher, Mrs. Hay, Montreal.

ONTARIO

The forty-first annual meeting of the Ontario Medical Association took place at Niagara Falls on May 31st, June 1st, 2nd and 3rd, 1921. The importance of this association can be gathered from the fact that there were registered between seven and eight hundred physicians, and since in addition to an excellent scientific programme, much business of vital interest to the medical profession at large was transacted, it is considered wise to publish seriatim a complete report of the meeting.

Too much credit cannot be given to the very able officers of the association, the President, Dr. J. Heurner Mullin; the First Vice-President, Dr. F. J. Farley; Second Vice-President, Dr. F. A. Clarkson; the Hon. Secretary, Dr. T. C. Routley, and the Hon. Treasurer, Dr. G. Stewart Cameron.

The Committees on Programme, on Entertainment, on Arrangements, on Publicity, on the sections of Medicine, Surgery, Obstetrics and Gynaecology, Eye, Ear, Nose and Throat, and Radiology, must be complimented on the active, business-like manner in which their various duties were performed.

Especially to be noted was the appearance of a daily bulletin, and the appearance, in addition to the programme, of two other printed booklets, one detailing the post-graduate schedule organized by the association, with the aid of the Universities of the Province; the other, a complete record of the business programme, which included the articles of incorporation of the Ontario Medical Association, the by-laws and reports of the various committees; these articles, by-laws and reports will be published in the news items of the Ontario section.

A departure from the usual method of procedure was the publication and distribution of the presidential address before its delivery, done in order that the essentials might be the better grasped.

The scientific meetings held in the auditoriums of the Clifton Hotel were well attended, began fairly promptly, and brought out considerable discussion. It is much to be regretted, however, that the association has as yet no arrangements for a complete stenographic recording of addresses and discussions. No proper description of an association's meeting can be made without an arrangement of this sort, and one realizes that much of the value of any scientific meeting depends upon these first-hand notes, particularly to-day when free-hand talks are taking the place of written papers.

The programme of the scientific side of the meeting has already appeared in a previous number. It would be of questionable value merely to detail the papers read and addresses given, without the discussion which should go therewith. The Editorial Board wishes, however, to express the hope that at the next meeting nothing shall be allowed to go unreported, so that papers and discussions may reach subscribers not present at the association's gathering.

Particular mention must be given to the address in medicine by Dr. Frank Billings of Chicago, "Modern Medicine and the General Practitioner"; to the address in surgery by Dr. E. Starr Judd of the Mayo Clinic, "Surgery of the Gall Bladder and Bile Ducts," and to the addresses by Dr. White of Pittsburg, Dr. G. C. Stewart of New York, Dr. John Amyot of Ottawa, and the President of the association, Dr. J. Heurner Mullin, which followed the two dinners. The conditions under which these addreses are given make this feature of the association's meeting something quite unequalled in any medical gathering, and are to be recommended to any committees who are interested in seeing a satisfactory demonstration of any project.

The programme in the section of medicine comprised two symposia, "diabetes" and "pneumonia" occupying a morning and an afternoon, respectively, two morning sessions on other days, and a joint session with surgery, a symposium on "gastric and duodenal ulcer" taking one other afternoon, giving in all two and one-half days.

The section of gynaecology and obstetrics occupied in its turn one complete day and two half days, including a joint session with surgery.

The surgical section occupied one full day, two half days and, as noted, another half day in combined session with medicine.

The importance of the x-ray section can be judged from the fact that both Ontario and Canadian Radiological Societies were meeting in conjunction, and that two full days and a half were required for the staging of their programme.

Eye, ear, nose and throat required one full day and two half-days for the presentation of their papers and discussion.

Each contributor to the programme has been written to, asking for the paper, the address or the substance of his remarks. It is urged that in future everyone appearing before the association shall be required to give at least a resumé of his remarks, if they do not exist in the form of a written paper.

(To be continued)

A Visit to Algoma and Thunder Bay

In order that closer co-operation might be established between the northern and other parts of the Province, a unique plan was decided upon by the Directors of the Ontario Medical Association.

On Monday, Sept. 5th, a party of ten, including four doctors' wives, left Toronto at 7 p.m., arriving at Sault Ste. Marie at noon on the following day, when the party was cordially received by several members of the local medical profession. At 3 o'clock in the afternoon the first meeting opened at the General Hospital, with Dr. J. R. McLean, President of the Saulte Ste. Marie Medical Society, in the chair, and practically the entire medical profession of the district present. The first paper was given by Dr. F. W. Marlow of Toronto, his subject being "Inflammatory Diseases of the Female Pelvis." From the practical way in which the subject was handled, and the discussion which followed, it was quite apparent that the hour had been appreciated by all present.

The next address was presented by Dr. Geo. S. Young of Toronto on the subject of "Goitre." Dr. Young in his discourse systematically discussed goitre from every angle, particularly bringing out the very latest ideas as to aetiology, differential diagnosis and treatment. By the rapt attention accorded the speaker it was evident that the local Medical Society thoroughly appreciated Dr. Young's presentation.

The meeting adjourned at 5.30 p.m. to take a drive about the city, the party drawing up at the Country Club for dinner at 6.30 p.m. This happy function, again presided over by the President, Dr. McLean, afforded a splendid opportunity for the visiting gentlemen to become acquainted with their colleagues in Algoma.

The meeting assembled at 8 o'clock at the General Hospital for the evening programme. Dr. E. R. Secord of Brantford, the first speaker on the programme, gave a most interesting and practical paper on the subject of "Some Observations on Abdominal Surgery of Interest to the General Practitioner." Particularly outstanding in Dr. Secord's remarks were the views which he set forth in regard to the diagnosis and treatment of many of the more frequent abdominal conditions requiring surgical intervention. The paper brought out some very interesting and profitable discussion.

Dr. R. S. McComb followed with an excellent discourse on "Cystitis," his subject also appearing to be of marked interest to the gathering.

Dr. F. J. Farley of Trenton, President of the Ontario Medical Association, in a brief address marked with cordiality, sincerity and humor, left nothing to be conjectured in the minds of his hearers as to the absolute need of greater co-operation and unity on the part of the medical profession in this Province.

Dr. T. C. Routley of Toronto, Secretary of the Ontario Medical Association, presented to the meeting a resumé of the progress which had been made by the Association up to the present time, and strongly urged upon everyone present the advisability of the medical profession throughout not only the Province of Ontario, but the entire Dominion, becoming thoroughly organized for the benefit of the profession and the public.

Dr. Edgar Brandon of North Bay, Counsellor for the district in the Ontario Medical Association, in a few very pointed remarks brought forth the advantages which had accrued to other groups in society by unified and organized efforts. The day's session came to a close at midnight with a unanimous vote of thanks being tendered to the visitors by the Sault Ste. Marie Medical Society for the splendid programme which had been presented.

The visitors departed from the "Soo" at noon on Wednesday on board the steamship "Hammonic" bound for Port Arthur. The hearty send-off accorded them by the local medical profession was a very fitting culmination to the splendid hospitality which was in evidence throughout the entire stay at Sault Ste. Marie.

Arriving at the Prince Arthur Hotel, Port Arthur, early Thursday morning, the party was met by a group of practitioners of the twin cities of Port Arthur and Fort William. Here again was evident a hearty reception on all sides.

On the evening of Thursday the visiting doctors were called upon to participate in functions a little apart from ordinary Medical Society meetings, when Drs. Marlow and Routley were invited to address the Kiwanis Club dinner, and later in the evening, Drs. Farley, Marlow and Routley extended greetings to the graduating class of nurses from St. Joseph's Hospital.

The first general meeting commenced at 9 p.m. on Thursday, the programme being taken by Drs. Secord, Young and McComb, who presented the same subjects as they discussed at the "Soo."

Friday was a busy day. Togther with visits to the local hospitals, luncheon parties, clinical work, and a drive to the most picturesque Kakebequa Falls, some twenty miles distant from Fort William, a most pleasant time was enjoyed by all. At 8 p.m. a get-together banquet was served, and was followed by a programme supplied by Drs. Marlow, Farley and Routley.

On Saturday morning the party left for the east on board the steamship "Hammonic," a large representation of the local medical fraternity being present to extend heartiest felicitations to their guests and their colleagues in the East.

The visitors arrived home on Monday, September 12th, each one enthusiastic with praise for the delightful and profitable time which had been spent. It is particularly worthy of note that during the meetings held the attendance at both points for a radius of more than one hundred miles was in the neighborhood of 99 per cent. of the local practitioners.

Ontario News Items

To Counsellor District No. 9 of the Ontario Medical Association, presided over by Dr.

Edgar Brandon of North Bay, belongs the credit of having staged for the second time the most unique district meeting yet held by the Association. According to arrangements, every detail of which was thoroughly worked out by the committee in charge, a party of one hundred, including a fair share of ladies, boarded the steamer "Armour" at Burk's Falls at nine o'clock on the morning of August 3rd setting sail down the beautiful Magnetawan River.

The morning was spent in a social manner. At 11.30 the party disembarked at Magnetawan village, being entertained to luncheon by Dr. and Mrs. J. S. Freeborn. Most sumptuous indeed was the repast, and, despite the hearty appetites which the morning hours had developed, the party found it difficult to do full justice to the elaborate courses which were laid before them.

The steamer was again boarded at 1 p.m., proceeding down the Ahmic Lake, the afternoon hours being occupied by the following excellent programme:

1. Fractures as Related to the General Practitioner. Dr. W. E. Gallie, Hospital for Sick Children, Toronto, Ont.
2. What Will Radium Do? Dr. H. A. Kelly, Johns Hopkins University, Baltimore, Md.
3. Diagnosis and Results of Surgical Treatment of Tuberculous Colitis. Dr. C. D. Parfitt, Calydor Sanatorium, Gravenhurst, Ont.
4. Infant Feeding. Dr. Charles Summers, Prof. of Pediatrics, University of Maryland.
5. Child Welfare Work in the Country. Dr. W. J. Bell, Provincial Board of Health, Ontario.
6. Abdominal Surgery. Dr. Thomas S. Cullen, Johns Hopkins University, Baltimore, Md.
7. Vital Need of Sanitation in Country Districts and Smaller Towns. Dr. Lillian South, Chief Bacteriologist, State of Kentucky.
8. The Development of a Modern Medical School. Chancellor James Kirkland, Vanderbilt University, Nashville, Tenn.
9. Medical Education. Mr. Abraham Flexner, LL.D., Secretary of the General Educational Bd. of U. S. A.
10. Eclampsia. Dr. G. W. Smith, North Bay, Ontario.

At 5.30 p.m. the party again disembarked at "Wildwood," Lake Cecebe, the summer home of Dr. and Mrs. H. L. Barber, where the ladies of Burk's Falls and Cecebe Lake entertained at supper in a manner quite rivalling the bountiful hospitality shown by Dr. and Mrs. Freeborn. Following supper, several members of the party enjoyed a game of golf on the splendid course which Dr. Barber has established at his summer home. During the evening sail back to Burk's Falls short addresses were delivered by the following officers of the Ontario Medical Association:

Dr. F. J. Farley, President.
Dr. T. C. Routley, Secretary.
Dr. E. R. Secord, First Vice-President.
Dr. J. H. Mullin, Past President.
Dr. Edgar Brandon, Counsellor, District No. 9.

It was unanimously conceded at the close of the day that from the point of view of a pleasurable outing and an excellent programme, the occasion could not have been surpassed. Some slight idea of the interest manifested in the meeting may be gauged when it is pointed out that some of the practitioners travelled distances approximating five hundred miles to be present. To the committee in charge, Drs. Freeborn, Barber, McMurchy, Douglas and Brandon, heartiest congratulations are due.

A meeting of the Northumberland and Durham Medical Society was held in Cobourg on July 13th. Col. E. Stanley Ryerson of Toronto gave a very instructive paper on "Diagnostic Methods."

A meeting of the Northumberland and Durham Medical Society was held in Bowmanville on August 3rd. Dr. Herbert A. Bruce of Toronto gave an instructive address on the subject of "Acute Abdominal Diseases."

The Western Ontario Academy of Medicine has reorganized for the session of 1921-22 under the following Executive: President, Dr. F. W. Hughes; Vice-President, Dr. C. F. Harris; Treasurer, Dr. J. I. Ferguson; Secretary, Dr. Geo. A. Ramsay; Executive, Drs. George Hall, Fred. Campbell, E. L. Hodgins.

The autumn programme includes an opening session on "Tuberculosis," by Drs. Pratten, Moyle, Broome and Andrews at the Queen Alexandra Sanatorium, on Sept. 29th. During the week of Oct. 3rd will be given at the Sanatorium, a post-graduate course on "The Early Diagnosis of T. B.," which is open to practitioners on payment of a nominal fee. This course will occupy both morning and afternoon, and will include lectures, laboratory methods and clinical examinations. In addition to the Sanatorium staff, the following will contribute: Drs. McGregor, Hill, Crane, Williams and Fisher.

On Oct. 7th the first general meeting will be held in the New Medical College, London, when the programme will be of a neurological nature, and will be furnished by Dr. W. E. Dandy of Johns Hopkins Hospital, Dr. Chas.

Trew of Indianapolis and Dr. Russell McRobert of New York.

The November meeting will be held early in the month, and will be contemporaneous with the formal opening of the Medical College. The speakers on that occasion will be Dr. L. Barker of Johns Hopkins Hospital and Dr. Clifford Grulee of Chicago. The former will hold a medical clinic and the latter will present some phases of pediatrics.

On November 29th Dr. Bloodgood will deliver an address, and it is expected that Dr. George Armstrong will be associated with him on that occasion.

The seventh and final session of the Western Ontario Academy of Medicine was held on May 24th at 2 p.m. Papers were read by Dr. John B. Deaver of Philadelphia, and Dr. George B. Eusterman of the Mayo Clinic. Invitations had been extended to all visitors to inspect the new building, and the Medical Alumni of the University met during the day for reorganization and at night for a banquet. There was a most enthusiastic attendance, and the meetings throughout were characterized with the greatest enthusiasm.

The Perth and Oxford County Medical Societies met in conjunction at Lake View on June 29th. There was an excellent attendance at this charming but little known resort, in the heart of the Province. Dr. Cannon of Hamilton presented the subject of "Septic Abortion" in most acceptable form, an address which brought out excellent discussion from the experienced practitioners of the district. Dr. Gwyn of Toronto spoke on the subject of "Pernicious Anaemia and Its Treatment by Blood Transfusion," demonstrating specimens of anaemic blood and showing the agglutination reactions which may take place in bloods improperly grouped.

A meeting of the Northumberland and Durham Medical Society was held in Colborne, August 24th. Dr. W. T. Connell, Professor of Medicine, Queen's University, delivered a very instructive address on Sub-acute Endocarditis. The society was fortunate in having with them Dr. F. J. Farley, President of the Ontario Medical Association. He favored them for a few minutes with a strong address on the work of the Association in the interests of the profession throughout the Province.

There was a very good attendance and a most enthusiastic meeting.

The Victoria County Medical Society was organized at a meeting in Lindsay on Friday, July 22nd. The President of the Ontario Medical Association, Dr. Farley; the Counsellor of the District, Dr. McQuade of Trenton, and Dr. Routley, the Secretary of the Ontario Medical Association, all took part in the proceedings. Owing largely to their enthusiasm and the excellent words of advice of the President, a small but enthusiastic gathering of physicians quickly got together, formed themselves into an association with the following as officers: President, Dr. W. G. Collison, Lindsay; Secretary, Dr. F. Blanchard, Lindsay.

The meeting closed with an address by Dr. Gwyn of Toronto on "Heart Disease as Seen in General Practice," with some special notes on treatment.

A session of the Academy of Medicine of London, Ont., was held in the auditorium of the new Medical College building on April 25th, Dr. George McNeil presiding. The meeting was very largely attended by over two hundred physicians, an evidence, indeed, of the increasing interest which this medical society is stimulating among the practitioners of Western Ontario. Two excellent papers must be noted, one by Dr. W. T. Connell, Professor of Medicine, Queen's University, on the subject of "Sub-acute Bacterial Endocarditis"; the other by Dr. James T. Case of the Battle Creek Sanitarium, and of the Northwestern University Medical School of Chicago, on "The X-ray Aid in the Differential Diagnosis of Right Upper Quadrant Lesions." It is much to be regretted that these papers cannot be detailed in this column, but it is hoped they will appear in complete form in the Journal at some future date.

Book Reviews

Guide to Diseases of the Nose and Throat and Their Treatment. By Charles A. Parker, F.R.C.S., Edin., Consulting Surgeon to the Throat Hospital, Golden Square, W., and Lionel Colledge, M.B., F.R.C.S., Surgeon to the Ear and Throat Department, St. George's Hospital, S.W., and to the Throat Hospital, Golden Square, W. Second Edition. London, Edward Arnold, 1921.

The second edition of Parker's work on the nose and throat has now appeared and Mr. Lionel Colledge is associated with it.

Those who have had the opportunity and pleasure of reading the first edition will be gratified to know that the second edition follows closely along the lines of the former. The book is essentially written to assist general practioners and students in becoming familiar with the diseases of the nose and throat.

The first edition consisted of 602 pages, but in this many portions of it have been entirely re-written, and it has been possible to omit many debatable points that occupied considerable space in the former edition. The book is well written and is a thoroughly reliable guide to the treatment of the diseases of which it deals. The illustrations are well chosen and special care seems to have been taken to carefully consider the disorders that one is likely to meet with in general practice. It may be recommended to students and practitioners as a work which embodies British practice of Rhinology and Laryngology, and when one follows this he will not be running after fads and his patients will have the best.

P. G. G.

Principles of Treatment. By Oliver T. Osborne, M.D., Prof. of Therapeutics, Yale University. 881 pages, 8 vo. Price, $7.00. Philadelphia and London, W. B. Saunders Co., 1921.

This volume is an indication of the transition that therapeutics is undergoing. Only 343 pages are devoted to the consideration of the action of drugs, while over 400 pages are devoted to the consideration of endocrine glands and their principles, vaccines and sera, diet, mechanical and electrical treatments, the treatment of certain types of chronic poisoning by drugs or in industry, and of certain types of emergency. A further chapter is devoted to certain common skin affections. The descriptions of the actions of the drugs with which the author deals are neither clear nor such as would be written by a pharmacologist of the newer school. The therapeutic advice is sound, a little dogmatic and evidently based largely on the author's own experience. There are some obvious errors, for example page 56, under beta-eucaine, we find the statement that "novocaine and procaine are the same as beta-eucaine." A useful feature which should appeal to the practitioner is the careful statements of the toxic actions of each drug discussed, whether due to overdosage or idiosyncrasy of the patient, with an indication of the treatment that should be employed.

V. E. H.

The Extra Pharmacopoeia. Vol. II., 17th edn. By W. H. Martindale, Ph.D., F.C.S., and W. W. Westcott, M.B., D.P.H. 688 pages, 5' cap, 8 vo. Price, 17/6. London, H. K. Lewis & Co., ltd., 1921.

This book of pocket size, which is an addendum and supplement to the first volume, contains a wide diversity of material, much of which is not pertinent to a pharmacopoeia. The authors have really attempted in these two volumes to write an encyclopedia of pharmacy and medical chemistry. The practitioner may find it of value if used in this way, but the greater part of the book is quite valueless to him, for example, "Isotopes and Atomic Weights," "Indicators for use in Volumetric Analysis," "Physiological Effect in Comparison with Chemical Constitution of Synthetic Drugs," "Water Analysis." Even if he wanted instruction on these points he would find the instruction too brief and not sufficiently elementary to be of value. The long sections on radiology, radium and ionotophoresis suffer in a similar manner. The authors' wealth of chemical information is apt to overwhelm all except those whose particular field enables them to understand to evaluate the detail presented. The work is, of course, of great value to the specialist in pharmacy. An interesting section gives some of the formulae of British quack medicines.

V. E. H.

Clinical Surgery by Case Histories. By Arthur E. Hertzler, M.D., Ph.D., F.A.C.S., Professor of Surgery in the University of Kansas. Two volumes, 1,106 pages, with 544 original illustrations. Price, $18.00. Published by C. V. Mosby Co., St. Louis, 1921; Toronto, McAinsh & Co., Ltd.

In these volumes the author covers the field of clinical surgery from the standpoint of the case history, grouping his cases according to a typographic classification dependent upon the chief complaint. To this history is added the facts elicited on examination, the working diagnosis, the treatment, the pathology, the after course, and finally a comment on the case viewed retrospectively.

The whole work makes extremely interesting and instructive reading, and emphasizes the real value of an accurate history in making a diagnosis.

As is to be expected, cases of rather more than usual interest are predominant, and since this unusual interest was often dependent upon an error in diagnosis, or mistaken judgment as to treatment, the work is hardly to be considered as a text-book describing typical conditions. The author is particularly to be congratulated on the frank manner in which he has commented on errors in both diagnosis and treatment, since often one learns more from a full consideration of his own or others mistakes than from a series of normal cases. One cannot read these volumes without receiving a distinct stimulus to personal thought as to what the reader himself would have done under the conditions outlined. As a consequence, they will appeal especially to those who from past experience are able to compare the cases reported with those that they themselves have seen.

The treatment which has been carried out is usually based on sound surgical judgment, but one can hardly agree with the author that "crises in the lower abdomen are seldom immediately dangerous, and the indications for surgical operations are rarely absolute." He would also appear to be treading on dangerous ground when apparently favoring a waiting policy in certain cases of ruptured tubal pregnancy.

The work will well repay a careful and thoughtful perusal by anyone interested in the field of clinical surgery.

E. R. S.

Practical Chemical Analysis of Blood. Victor Carly Myers. C. V. Mosby Co., St. Louis. Price, $3.00.

In this book the author has given those chemical analyses of blood which he considers of value in diagnosis. The methods given are chosen so as to give the simplest technique consistent with reliable results. Besides the description of the methods there are valuable discussions and tables bearing on the interpretation of the various findings. The extensive bibliography following each heading and the details for the preparation of the reagents required are added features.

In addition to the analysis of blood, there is a section devoted to some of the quantitative determinations on urine.

This book, by such a well-known worker as Dr. Myers, should be a valuable addition to the literature of laboratory methods.

P. J. M.

A Text-book of Pathology. By Alfred Stengel, M.D., Sc.D., Professor of Medicine, University of Pennsylvania, Physician to the Pennsylvania and to the University Hospitals, and Herbert Fox, M.D., Director of the Pepper Laboratory of Clinical Medicine, University of Pennsylvania, Pathologist to the Philadelphia Zoological Garden. Seventh Edition, reset, with 509 text illustrations, many in colors, and 15 colored plates. Philadelphia and London, W. B. Saunders & Co., 1921.

The Seventh Edition of Stengel's Text-book of Pathology follows the style of previous issues in that the subject matter is presented paragraphic reference form. The book is, according to the authors, "an attempt to give the practitioner and student a conservative defensible opinion of the subject as it is understood to-day." The work is divided into two parts dealing with general and special pathology. No specific references to the literature are included, but brief summaries of the results of various investigations are given.

Throughout all sections effort is made to correlate the problems of disease as studied at the bedside and in the laboratory, and in consequence the reader is made to appreciate the close inter-relationship of problems which are often not so dealt with. Many of the illustrations are excellent, the colored plates being especially good.

J. G. F.

Principles of Hygiene. The New Edition. A Practical Manual for Students, Physicians and Health Officers. By D. H. Bergey, M.D., Dd. P.H., Assistant Professor of Hygiene and Bacteriology, University of Pennsylvania. Seventh edition, thoroughly revised. Octavo of 556 pages, illustrated. Philadelphia and London, W. B. Saunders Co., 1921.

This seventh edition of a well-known work is characterized by attention given to military and naval hygiene. The most striking feature from the academic standpoint is the inclusion in a book labelled as dealing with the principles of hygiene of a very great deal of sanitation. Thus under "air," quite 90 per cent. of the material given relates to the air, not to those who are to breathe it. The same might be said of the chapters on ventilation, on water, sewage and food.

The brief chapter on exercise is good, but the chapter on personal hygiene is barely four pages in length. Under industrial, school and military hygiene the same defect is found in that the surroundings are described in much detail (sanitation), but the reactions of the individual to those surroundings (hygiene) are little considered. Had this book been labelled sanitation rather than hygiene, its character would have been very much better described.

The chapter on "Vital Causes of Disease" is weak. The physician is directed to sleep at least eight hours a day while in attendance on infectious diseases in order to keep up his physical vigor, apparently as a prophylactic against contracting the disease under his care. No mention of immunity is made in this section, although the physician is warned against relying on the use of alcohol or drugs as protective agents!

One may consider this book as worth having for reference, on account of the accumulation of data it contains concerning a vast variety of interesting topics, from a list of tropical parasites to comments on metal armor worn by soldiers to protect against shell fragments; but as a systematic treatise on hygiene, it hardly meets the modern idea of hygiene, i.e., the cultivation of the body to meet the demands of its surroundings. Its chief lack is failure to indicate or discuss the application of the accumulated data to "the instant need of things."

H. W. H.

The Principles of Immunology. By Howard T. Karsner, M.D., Professor of Pathology, Western Reserve University, Cleveland, and Enrique E. Acker, Ph.D., Instructor in Immunology, Western Reserve University, Cleveland, J. B. Lippincott Co., publishers, Philadelphia and London. Canadian office, 201 Unity Bldg., Montreal. 309 pages, with 18 illustrations and 2 plates. Price, $5.00.

This most recent work on the fundamental principles of immunity is, first of all, noteworthy, in that it is one of the first (if not the first) books on the subject from which all and sundry diagrams of the side-chain hypothesis of Ehrlich have been omitted. Having made this courageous beginning, it is all the more curious that the work is marred by the retention of the Ehrlich side-chain nomenclature. Why use the word complement when alexin is meant and also the word amboceptor when immune body or anti-body is so much more in harmony with the views (notably those of Bordet) to which the authors seem to incline?

The book has avowedly been written for senior students of medicine and for practitioners engaged in work which precludes the possibility of their keeping abreast of modern progress in this field. On this account, as well as on others, it is to be regretted that dogmatic assertions are made for which there is no conclusive evidence available at present. For example, on page 56 appears the statement, "the advantage of the use of diphtheria toxin-antitoxin mixture is that a lasting immunity is established." That this is actually established is certainly not the case. Then, again, on page 57, in reference to the early symptoms of tetanus it is stated "in man the symptoms appear as a rule first in trismus of the jaw muscles." On the contrary, experience during the great war demonstrated conclusively that much more frequently pain and stiffness of the part into which the tetanus bacilli had gained entrance were the characteristics early symptoms, and these appeared before trismus. Physicians who neglect or do not observe these earlier symptoms and await the appearance of trismus will have lost valuable time in beginning treatment.

In regard to the question of sensitiveness to horse serum possessing antitoxic properties (as, for example, diphtheria antitoxin) in order to avoid reactions it is proposed that "if sensitiveness to horse serum is known it is suggested that antitoxin in some other animal, such as the goat may be employed, but sera of this sort are not easily obtainable in the market." This suggestion is entirely without merit, since no such antisera are anywhere obtainable. Why not instead propose desensitization with minute doses of horse serum?

The following rather incongruous statement appears on page 273: "The terms vaccine is derived from vaccinia or cowpox and the method of protective immunization against smallpox with vaccinia virus was called by Jenner vaccination. This great *empirical* work, etc." The bewildered reader who previously may have imagined that Jenner's immortal work could hardly be so described, is relieved later when on page 278 it is stated that "it remained for Jenner in 1796 to furnish *scientific*

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For the reader or student with a good working knowledge of the subject and a previous appreciation of the principles of immunity this book will probably be found to be of value; for others it has no advantages not possessed by several others, no more extensive, books already available in English.

Evidences of careless revision are to be seen on page 58, where Thiele appears several times as Teale, and on page 106 Tschistovitch appears more than once as Tschistovichs. Other similar errors occur elsewhere.

J. G. F.

A Text-book of Pathology. By William G. McCallum, M.D., Professor of Pathology and Bacteriology, Johns Hopkins University. Second edition. Thoroughly revised. Octavo volume of 1,155 pages, with 575 illustrations. Philadelphia and London, W. B. Saunders Co., 1920. Cloth, $11.00 net

The excellence of MacCallum's treatment of the subject of pathology made it practically certain that this book would have a most favorable reception. Four reprints, including a second edition in four years, is tangible evidence of the character of its reception. The book is clear and lucidly written, and, as one would expect from a writer with the breadth of view of the author, contains much that is very illuminating from the standpoint of clinical medicine as well as that of pathology.

MacCallum in the preface to the first edition wrote: ''A constant effort has been made to speak of the disturbances of function and of chemical interchange in the course of disease as far as that was possible and even to describe symptoms. If this makes the book seem like a treatise on clinical medicine it is only because pathology and clinical medicine are, after all, the same thing viewed from slightly different angles.'' This serves to explain much of the merit of the book and to make evident its value to physicians and medical students alike.

The new edition is a considerable amplification of the first. The sections on shock, acid-base equilibrium, hydrocephalus, immunity in tuberculosis, meningococcal infections, pneumonia after measles, influenza, cholera, leprosy, etc., have all been re-written. Parasitic diseases also come for more extended attention.

This is a scholarly book written by a man who has a thorough grasp of his subject, and has made most substantial contributions to the knowledge thereof. It can, of course, be most warmly recommended.

J. G. F.

The Basis of Psychiatry. Psychobiological Medicine for Students and Practitioners. By Albert C. Buckley, M.D. J. B. Lippincott Co.

This is one of the most modern books on psychiatry that has been published, and it is planned in a new and caretaking manner. Commencing with a description of the parallel development of the nervous system in different species and a comparison of the views on heredity, the author then passes to the development of the human brain and of the human mental development. Psychology of the brain is then taken up in a very full manner, concluding the first part of the volume.

The cause of nervous disease is well laid down, stress on the inborent tendencies rather than psychical strain being the base of the writer's views.

The chapter on symptomology shows the author's predilection for psychological methods, while a careful chapter on laboratory work is fully taken up.

These chapters on psychology and preliminary studies take up half volume, and the remainder is given up to diseases, following the new classification of the American Association.

It is the best book for the student that has been placed in my hands and may be recommended without any doubt to the general physician.

G. H.

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Clinical Ophthalmology for the General Practitioner. By A. Maitland Ramsay, M.D., Lecturer on Ophthalmology, University of Glasgow. 500 pages with illustrations. Price $12.75. London, Oxford Medical Publications, Toronto, McAinsh & Co., Limited.

This treatise merits the highest praise. The author brings all the wealth of his long experience to the light; in simple language, precise enough to be convincing, yet singularly free from extreme technicality, he describes and treats nearly all the abmormal and diseased conditions of the eye-ball and its adnexa. Occasionally his unconscious enthusiasm appears to carry him into his own special sphere, but where extraordinary detail is given, it is done in such a manner as only to stimulate the interest in the general features of the topic.

The book reads like a novel. Everywhere is evident the sound common-sense of the author; his willingness to give honor where it is due; his entire freedom from faddism.

On every page one recognizes the width of his "field of thought"; in some way or other is shown how seldom eye-disease is an entity in itself; how often it is only a manifesta- of systemic dyscrasia. As in speaking of phylectenular conjunctivitis, "simultaneously with the cleaning of the tongue, the intolerance of light begins to pass off and the child opens its eyes".

Referring to the routine use of cocain and atropine, "it is a golden rule never to prescribe any drug that dilates the pupil to a patient over forty years of age, without first making certain that there is no increase in the tension of the eye-ball". Most of us dislike rules of thumb, but his are only enunciated after paragraphs of lucid argument.

The operative treatment for cataract and glaucoma is perhaps more fully discussed than is needful in such a work, but it does make the general reading more interesting, and he is careful to add, "The family doctor is frequently requested to be present at the operation but only rarely is he expected to assist the specialist".

The volume is well made; print good, and the color work of the best; and in every way it is "a book to which the general practitioner can turn with confidence to find the knowledge he wants".*

F. C. T.

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*From the foreword by Sir James Mackenzie.

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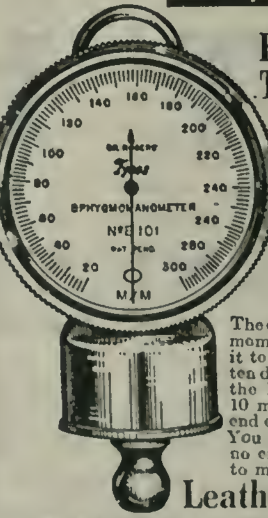

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TREATMENT OF PNEUMONIA WITH SPECIAL REFERENCE TO THE USE OF SERUM.

C. P. Howard, M.D.

Iowa City, Iowa, U.S.A.

THERE is no disease which has been such an alluring field for investigation to the enthusiastic therapeutist as has pneumonia. This is readily explained by the fact that it is a self-limited disease of short duration and that it is apt to run its course quite independently of what the clinician strives to do. Provided we follow a few elementary rules of nursing, the pneumococcus and its host carry on the battle, cooly ignoring the pin pricks and the irritations of the anxious and over-zealous practitioner of medicine.

Up to the past decade all therapeutic measures have been symptomatic, and as these are no doubt still important, we propose to discuss them first. It must be understood that we are speaking of the primary lobar pneumonia, and not those secondary to some other disease, as typhoid fever, influenza or one of the terminal pneumonias of the chronic maladies as cardio-renal insufficiency. As Means has recently well said, the symptomatic treatment of pneumonia has chiefly to do with the supply and demand of pulmonary ventilation. I think Means' attitude is the expression of the teachings of Haldane and his school, who have always insisted that "the physiology of to-day is the medicine of to-morrow." There is an increased demand for ventilation because of the following factors:

(1) An increase in metabolism. (2) The existence of acidosis. (3) The presence of anoxemia. (4) A deficient blood flow. (5) Superventilation of the lung; and (6) Restriction of the vital capacity, due in part to the consolidation of the lung and in part to tympanites.

The *increase in metabolism* can only be checked by combating the pneumococcus itself through the use of specific sera, but no doubt its effects can be restricted by supplying sufficient calories in the diet and by keeping down the fever by an ice bag and cooling sponges.

The *acidosis* present is usually slight but may be of a marked degree. When such is true, as indicated by the usual laboratory tests of the urine and blood, we have followed the practice of Litchfield[2] in using intravenous glucose solution in high concentration (25%). The amount given is 500 cc., which is repeated in 12 to 24 hours, if necessary. Further, soda bicarbonate may be added to this solution as well as given in full doses by mouth and per rectum.

The *anoxemia* or deficiency of oxygen in the arterial blood is an important factor according to Meakins[3]. Haldane, writes Barcroft[4], believes "anoxemia not only stops the machine but wrecks the machinery." Decreased alveolar CO_2 and hyperpnoea are often associated with a condition of oxygen deficiency, according to MacLeod[5]. Increase in H-ion concentration of the arterial blood on account of the appearance of unoxidized acids has been considered as the possible cause for the symptoms of anoxemia. The only possible treatment is to raise the tension of the oxygen in the alveolar air sufficiently to force some into solution in the plasma. There is probably no therapeutic measure that is less efficiently practised than the administration of oxygen. It would be laughable, were it not so serious, to see the average practitioner thrust a tube into the poor patient's nostrils and turn on the tap of the oxygen tank; or perhaps if he is more ingenious and has access to the ether mask, to try with this apparatus to provide the starving tissues with oxygen. By means of the Haldane method, according to Meakins[6], one can give oxygen at the rate of 2.5 litres of oxygen per minute with absolute certainty. Evidence of the benefit obtained is afforded by the easier and deeper breathing, the slowing of the pulse, the disappearance of cyanosis and the greater ease and comfort experienced by the patient. These effects may outlast the administration and certainly will serve to tide over a crisis. Treatment should be started early before irreparable damage has been done to the nerve centers and tissues and should be maintained until cyanosis has disappeared. The respiratory center is among the first to suffer from anoxemia, and this injury results in shallow and rapid breathing, which does not properly ventilate the lung, so that a vicious respiratory circle is established. While some prefer Haldane's mask, others recommend Meltzer's hollow tongue depressor; but of course the most satisfactory method would be to place the patient in a respiratory cabinet filled with oxygen, which every well equipped hospital of the future will no doubt possess.

The *deficient blood flow* can in part be met by the judicious use of cardiac stimulants as digitalis in one or other of its preparations. Digitalis is clearly indicated when the right heart becomes dilated or even when the first or second sound of the heart becomes dull and toneless. Then, and not till then, should digitalis be exhibited. Whether strychnia will aid directly or indirectly is a much mooted question. Personally, I prefer to use strychnia in such cases in full doses of 1/30 of a grain hypodermically every four hours.

The *super-ventilation of the lung:* The normal pulmonary ventilation depends largely upon the H-ion concentration of the blood, but also partly upon the CO_2, both of which have a stimulating influence upon the respiratory center. It is likely, therefore, that super-ventilation is very closely linked with the control of the reaction of the body fluids and with the etiological factors of acidosis. We may possibly combat this element when we treat the acidosis by the glucose and bicarbonate therapy previously mentioned.

The *restriction of the vital capacity* of the lung from consolidation is not within our control except through serum-therapy, but that due to tympanites is most certainly. The older clinicians among my audience no doubt have dreaded to see tympanites make its appearance during the course of pneumonia, and have resorted to turpentine stupes and turpentine enemata to overcome it. It is in my opinion good practice, and one that should be followed by the present generation.

Specific Treatment

Following the marvelous success of the antitoxic serum-therapy of diphtheria, it was believed by many that a new era had dawned in medicine. While it is true that antitetanic serum and antimeningitic serum have since been developed, we have been gradually compelled to realize that the majority of the bacterial diseases are not so susceptible to antitoxic serum-therapy, largely because bacteria, like the pneumococcus, typhoid bacillus, etc., owe their injurious effect to endotoxins which were not so diffusable and so did not produce antibody formation in the tissues and blood of the host to any measurable degree. The earlier attempts to produce specific antitoxic sera for pneumonia were very disappointing, and though the work of A. Fraenkel, G. and F. Klemperer, Pane, Roemer, Neufeld and Handel must never be underestimated, it was not until quite recently that Rufus Cole and A. R. Dochez arrived more nearly to the goal of our ambitions. The first important contribution of the staff of the hospital of the Rockefeller Institute was the recognition by Dochez and Gillespie[7], that pneumococci were not all alike biologically; in fact that there were at least three fixed groups, each one of which has its specific agglutinin and precipitin; they further recognized that at least 21% of the pneumococci could not be placed in either of these fixed groups, yet by their bile-solubility and morphology, could be classed with no other organism. This fourth group is the "scrap bag," so to speak, into which all pneumococci other than those of types I, II. and III. must be placed until some future time when some as yet unknown specific tests are discovered. It is indeed of interest that Lister[8], of South Africa, has already described one or two more specific groups. Cole and his co-workers believe that this variability of type accounts in part for the lack of success in the past with various polyvalent sera, such as those of Kyes, Nichols, McClelland and Camac. After much work, Cole[9] succeeded in producing a high titer serum for type I. pneumococcus alone, and advised that its use should be restricted to type I. infections, through the fear that if used in the other groups it would not yield such satisfactory results, and so fall into disfavor. When the use of the specific type I. serum was restricted to type I. cases Cole noted a remarkable effect upon the course of the disease, which was shortened and rendered less severe and the mortality of which fell from the average one of 25% or 30% to 10% in his first series and to 7.5% in a later one[10]. While statistics can always be made to prove the contention of the author, too many competent observers have verified in the main the contentions of Cole and Dochez, and in nearly every large centre in the United States and Canada, typing of the pneumococcus is being carried out and the specific serum used. Further, recently Cecil[11] has reported favorable results with the specific serum of type II., and others, as Spooner, speak favorably of it, though Cole still maintains that further work is necessary before a type II. serum of sufficiently high titer is available.

It is unfortunately a premise for the success of the specific treatment that typing of the pneumococcus be carried out. This means access to a bacteriological laboratory and a trained technician. In some of the larger cities such are available to the general practitioner. State Board laboratories are already offering similar opportunities, and it seems probable that in the near future it will be possible to send by mail sputa in a sterile container and to receive a report of the type by telephone or telegraph within twenty-four hours after the collection of the material. While this may not be ideal, it will certainly mark a great step in advance. The methods of determining the types are many and include Blake's method of mouse-innoculation[12], Avery's special culture medium[13] and Krumwiede's coagulation method[14]. The two latter, though possibly less accurate, are less time-consuming.

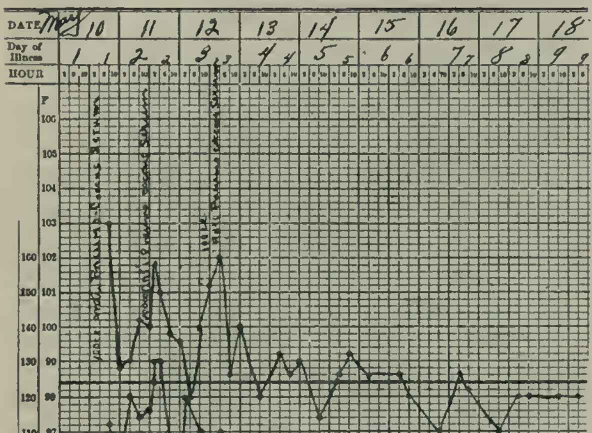
Procedure of administration: To avoid the dangers of anaphylaxis, one should first quiz the patient carefully for a history of hay fever, asthma, susceptibility to horse emanations and for the previous use of serum for such diseases as diphtheria, meningitis and tetanus. Even if one meets with a negative answer to these questions it is safer to give an intracutaneous injection of 0.02 c.c. of horse serum diluted ten times with normal sodium chloride solution and compare its effect with a similar amount of normal salt as a control. If a distinct wheal does not appear at the site of the injection in one hour it is safe to assume that the patient is not hypersensitive to horse serum. This may be done while waiting for the bacteriological report. Nevertheless, it is still well to give a desensitizing dose of 0.5 to 1.0 c.c.'s of horse serum subcutaneously one to two hours before the intravenous therapy. One can now safely give 100 c.c.'s of the high titer Rockefeller serum dilated with 100 to 150 c.c.'s of normal salt solution prepared from freshly distilled water. This can be administered by the gravity or by the syringe method with a three-way cock. The main caution to be exercised is to give it slowly, taking twenty to thirty minutes for the administration and to keep the solution at body temperature. During the early stage of the treatment the patient must be watched for cyanosis, pallor or dyspnoea and if these symptoms of anaphylaxis manifest themselves discontinue the injection and give immediately 10 minims of adrenalin (1 to 1,000) and 1/100 of a grain of atropine sulphate hypodermically. The latter should always be ready mixed and in the syringe for immediate use.

Usually in half to one hour after the intravenous injection of the specific serum, the patient experiences the so-called "*thermal reaction*" manifested by chill, cyanosis and elevation of the temperature; this we must confess is disagreeable to the patient and may cause the physician and relatives some uneasiness, however, shortly, or at least in the course of two hours this reaction is followed by a marked fall in the temperature, profuse sweating and muscular relaxation. This may be permanent, but usually in four to eight hours the fever returns and further treatment is necessary. Cole recommends that 100 c.c.'s of the serum be given every eight hours until the temperature remains normal—usually, however, three doses being sufficient.

In about fifty per cent. of the cases there may occur in seven to ten days the phenomena of the *serum sickness* in a mild form, viz.: urticaria, pruritus and arthralgia. In about ten per cent.

of the cases the reaction may be more severe and the patient suffer from a universal urticaria with intense itching, marked restlessness and a severe arthritis and so require treatment. This should consist of the subcutaneous administration of 10 to 15 minims of adrenalin and the external application of some soothing lotion as the following: Carbolic acid drm. s̄s̄; Zinc oxide oz. i; Glycerol drm. ii; Lime water ad oz. viii.

Results: It seems now generally accepted that the type I. serum causes the sterilization of the blood and a limitation of the spread of the process, with consequent shortening of the course of the disease as is well illustrated in Chart I.



The subjective and objective symptoms of the disease are ameliorated. Further, the mortality is definitely reduced, though as we have already warned you, too much emphasis must not be laid upon any statistics except in the mass. In hospital practice, type I. pneumonia has a mortality of 25%, in private practice it is no doubt much less. Further, while Cole's first series in the Rockefeller Hospital had a mortality of only 10% it must be borne in mind that these cases were no doubt selected ones and did not represent the bad risks of a general hospital, to which are usually brought patients on the fourth or fifth day of a severe infection which has resisted the ordinary efforts of home nursing and medical supervision. That ten per cent. is not an unusually low mortality in selected cases is shown by the fact that the Surgeon General of the United States Army[15] reported 6,964,000 cases of primary lobar pneumonia for the year 1917 with a mortality of only ten percent. These cases represented all groups and included many cases not treated by serum-therapy. Be this as it may, Cole later reported a series of 107 cases of type I. pneumococci treated with the specific serum in which the mortality was only 7.5[10]%, a further saving of two to three lives in every hundred. Still more remarkable are Spooner's[16] figures from Camp Devens, Massachusetts; Spooner succeeded in reducing the mortality in a series of fifteen influenzal cases associated with type I. pneumococcus, to seven per cent. by the use of a high titer serum—a striking contrast to the thirty-one cases which did not receive serum-therapy and in which the mortality was 43%. Cole's[17] last report of 195 cases treated at the Rockefeller Hospital with 300 cases from the literature yielded a somewhat higher mortality, viz: 10.5%.

Such observers as Cole, Dochez[18], Spooner, Lord[19] Cecil[20], etc., are convinced of the value of the serum in type I. infections and believe there is no escape from the obligation to use it. We can only say that we are of a similar opinion, though our series is yet too small to be used as an argument in its favor. Our prejudice is based rather upon the reports from literature and the observation of our own small series.

Just one word more—the sooner the serum is given, the more effective it will be, for as Cole has shown in the pneumonia infection, there is an elaboration of soluble inhibitory substances which tend increasingly to diminish the potency of the serum as the disease progresses.

Stengel[21] has recently recommended the further use of "*convalescent serum*" obtained from the patient shortly after the crisis. In eight cases of primary acute lobar pneumonia, he reports but one death, while in twelve influenza pneumonias there were three deaths. He advises the use of only 30 to 70 c.c.'s of the "convalescent serum" which has been kept on the ice in a sterile container and used as soon as possible, preferably not later than ten days to two weeks after collection. Stengel does not recommend it as a substitute for type I. serum, but rather for cases which belong to the other groups.

Vaccine therapy: Pneumococcus vaccine is a suspension of killed pneumococci in broth or salt solution. It may be monovalent, as is the rule in the autogenous preparation, or polyvalent as in the stock or commercial form. It is usually given subcutaneously in doses varying from 10 to 1,000 million pneumococci or even more. Time will not permit us to discuss in detail the reactions that follow its use; suffice it to say that they are very similar to those of anti-typhoid vaccination. As a prophylactic measure, it may have some distinct value, according to Cecil and Austin[22]. Therapeutically, Rosenow[23] has recommended the use of partially autolyzed pneumococci in daily doses of 1.0 c.c. until the temperature reaches normal; in 200 cases so treated, there were but 14 deaths or a mortality of only 7%. This of course compares favorably with the results of serum-therapy, but it has not yet received a sufficient trial. Rosenow frankly admits that the serum treatment of type 1. infections should take precedence, but he recommends the use of his antigen when serum is not available and in the other types of infection.

Pneumococci vaccine is contra-indicated, according to Cecil[24], in acute infections, in chronic pulmonary tuberculosis and nephritis. It should not be administered in large doses to patients with chronic cardiac disease, or to invalids or to pregnant women after the fifth month.

Conclusions: In spite of a more or less intensive study of the problems of pneumonia during the past ten years, particularly by the American Research student, we must confess that no startling advances have been made. However, even the most conservative are forced to admit that real progress has been achieved, and particularly in the recognition of the various types of pneumococci and the preparation of a serum to combat one strain, at least.

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ETIOLOGY OF RENAL INFECTIONS*

With Special Reference to Urinary Stasis in Infections of the Renal Pelvis.
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Bacteria are the exciting cause of bacterial infections, but not the sole cause. Many are saprophytic and only under certain conditions become parasitic and pathogenic. Many bacteria, which can become pathogenic are almost universally present in the throat, bowel and skin of almost all individuals. This is especially true of the microorganisms found in the kidney where by far our most common, excluding the tubercle bacillus, are the colon bacillus and staphylococcus. Indeed these common bacteria are universal symbiotics of the human species and probably every one of us carries them about on our mucous and skin surfaces. Almost universally and daily the bacteria are invading the blood stream in varying doses; they are being distributed throughout the tissues and are got rid of by the excretory channels, occasionally becoming pathogenic and setting up a local or general inflammation.

The problem is not how we can sterilize the world of pathogenic bacteria, but why these bacteria become pathogenic in certain individuals and not in others. To remove all pathogenic bacteria from the world would be a hopeless problem. We never shall be able to sterilize the alimentary canal nor is it desirable that we should do so.

In the causation of disease predisposing factors of great variety must exist to enable the exciting cause, the micro-organisms, to act; the bacteria, the exciting cause, are universally present. The predisposing causes are variable factors and when present in a certain individual in one or more variants enable the bacteria to set up inflammation and fever or in other words "disease."

We cannot sterilize the world. Human life would come to an end if we did. In many ways bacteria are necessary to human life. We must live with bacteria and use bacteria, as for instance, in digestion. I cannot therefore agree with some of our professional friends who would, if they could, remove the whole intestine, preferring to see us die of starvation rather than see us suffer from what they call "Intestinal Toxaemia." Let us therefore cease our hopeless endeavours to kill all bacteria and let us devote our efforts to preventing pathogenic infections by methods of raising immunity, artificial and natural; and to educating the man in the street to live by simple hygienic rules based on the avoidance and removal of predisposing causes. This will meet Sir James MacKenzie's criticism, that we do not investigate the early symptoms of disease in the stage before they have caused permanent anatomical changes in the organs.

If preventive medicine is to accomplish the best results in this line, it is not by ridding the world of all bacteria but by teaching us how to live with our parasites and by endeavouring only to get rid of those which it is clear we would be better without, such as the tubercle bacillus, the gonococcus, the spirochaeta pallida, etc.

In the kidney the mere physical presence of one or more bacteria does not constitute a nephritis medically or surgically. Here we come to the academic differentiation between toxic and infectious nephritis. The bacteria are not the cause of the toxic nephritis but the poison they produce is the cause and this poison can do the damage with equal ease whether the bacteria are in the tonsil or the kidney provided the poison reaches the kidney.

The bacteria which most commonly are, or may be, the exciting cause of renal infection may be roughly grouped as follows: First, the coccus group, chiefly staphylococcus; second, the acid-fast bacillus which means practically only the tubercle bacillus in man; third, the colon bacillus group in order of frequency; communis, communior, acidformans, fecalis, etc.; and fourth, the rare forms of bacteria found in the urine of unknown pathogenicity. Of these types the colon bacillus is by far the commonest infecting organism of the urinary tract. From eighty to ninety percent. of persistent urinary infections excluding tuberculosis, are due to the colon bacillus. Paths by which infection may reach the kidney, namely by way of lumen of urethra and ureter, the blood stream and lymphatics, have been discussed and again discussed. We believe the blood route is by far the most common but we will not stop here to discuss our reasons.

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*Read before The Canadian Medical Association, Halifax, July, 1921.

The excretory power of the kidney for bacteria has been recognized for years but not sufficiently appreciated by clinicians. Albarran demonstrated that in blood infections the organisms were eliminated by way of the kidneys in some cases without damage that could be demonstrated.

Positive guinea pig tests are frequently obtained from the urine of tubercular patients where at autopsy no lesions of the kidneys are found. The same is true of typhoid or paratyphoid cases. It must be remembered that bacteria either from the action of the blood or the kidney tissue through which they pass, may be dead when they reach the urinary stream and no urinary infection results. Unilateral renal lesions also result from blood infection. Crabtree produced a unilateral renal lesion in a rabbit by injecting colon bacilli into the ear vein.

The important factors concerned in renal infections that determine the character of the lesion produced and the extent of damage done, are the type of organism: staphylococcus, tubercle, etc.,. the lack of proper drainage or retention, and after the lesion is started the acquired immunity of the individual.

The tubercle bacilli cause lesions in all parts of the kidney. A study of a series of kidneys removed at operation for tuberculosis indicates in a general way the following paths of infection.

I. *Cortex:* The bacilli entering the kidney by the blood stream gain a foothold in the loops of the glomerulus or in the capillary circulation supplying the tubules. Thus small primary tubercles are formed which spread, fuse and generally caseate, extending to the medulla. Any injury of the endothelial cells, either traumatic or toxic, combined with the mechanical conditions of the circulation favors foothold for virulent bacilli.

II. *Medulla:* The earliest lesions seen in this zone appear frequently at or near the apices of the pyramids (excretory type). Tubercle bacilli which are discharged into the tubules are at this point exposed to stagnation, and possibly the action of crystalline substances, etc., in concentrated form may easily damage the epithelium. In this region we have frequently demonstrated stasis in normal kidneys. Blood and excretory infection may combine.

III. *Pelvis:* Here the lesions apparently begin in the sub-mucosa, the bacilli being brought by the blood or lymph route and gaining access due to local conditions of lowered resistance as in the other types. Pelvic infections may, however, also become secondary to entrance of cheesy masses with bacilli from cortex and medulla.

It must be considered that these statements are very general and made only from observations on operable cases (i.e. on cases in which a diagnosis of unilateral involvement only was made and in which a good prognosis seemed justified).

The initial lesions are the typical tubercle formations. The subsequent history depends on the virulence of the bacilli and the local resistance. As a rule in the cortex multiple small foci form which spread and coalesce.

In the medulla the pelvis usually becomes early involved and the kidney may be reinfected giving the picture of an ascending infection. This is also the picture when the pelvis is the starting point.

Finally, all parts of the kidney, pelvis, medulla and cortex become involved and it must be understood that a great percentage of the kidneys removed show this advanced stage in which it is no longer possible to venture even a guess at the location of the point of entrance of the bacilli.

The coccus type of infection results in glomerulus and cortical lesions which, from the habit of the organism and its high pathogenicity, result in suppuration and production of abscesses and extensive perirenal fat invasion with abscess formation. Cocci appear in the urine late and rarely cause pyuria,—but staphylococci can be obtained from the culture of the urine in many of these cases. The cocci form lesions in the cortex and spread to the perirenal tissues but very rarely invade with their lesions the tubules or pelvis.

The infection starts as a boil or a carbuncle on the skin, infection of tonsils or sinuses; of prostate or seminal vesicles, etc. Usually a history of some such focus of infection a week to several weeks previously is obtained.

With the colon group the picture is entirely different. Of comparatively low pathogenicity, the organisms may pass the kidney leaving little or no trace of their course to be seen in microscopical sections, save cloudy swelling of the tubules in their convoluted portions. Unlike the coccus family that settle and grow on entering the cortex, the colon group quickly reach the urinary stream. There is a marked attendant functional derangement of the kidney evidenced by a low phenolsulphonephthalein output which is quite temporary and often quickly followed by almost complete recovery of functional activity. The condition is a low grade pyelonephritis of a functional nature rather than a definite pathological entity. In fact the pathologist often passes the kidney which has shown marked decrease in function as a normal kidney.

Should drainage be perfect the condition subsides immediately but if drainage is interfered with, as in kink of ureter in a sagging kidney, the stagnant urine affords the organisms an opportunity to multiply and grow and at the same time renders the kidney tissues less resistant from distention of renal pelvis.

The subject of colon bacillus pyelitis and pyelonephritis in its acute form, has been investigated with thoroughness in many of its aspects. Cultural peculiarities of the organisms concerned and antibody production, which might be of value in therapy, have received exhaustive attention. Treatment of the disease based on special bacterial peculiarities has been at best discouraging; nor has drug treatment been sufficiently definite to exclude any one of many recognized therapeutic measures as the several "schools" existent today bear witness.

Bacteriologically, all are agreed that eighty to ninety percent of persistent urinary infections (excluding tuberculosis) are due to colon bacillus. The organism may be divided into "strains." These, however, bear close relationship and differ somewhat but not greatly in motility and minor cultural characteristics. These all are hardy organisms with almost phenomenal ability to live and flourish in unfavourable surroundings. In fact they need no elaborate food supply but can live off the country and almost any country will do. In fact the study of bactericidal solutions is made in most instances with the colon bacillus at the end of the scale which represnts the hardy organisms. The urine is not a favorable culture media. The colon bacillus persists here in spite of hardships and because of the adaptability of the organism.

Pathologically, also, there is agreement that pyelitis is the characteristic lesion. The pelvis mucosa and to some extent submucosa is involved in a chronic inflammatory process.

In pyelonephritis, its common acute form, invasion of the tubules takes place in addition. Seldom is this infection sufficiently severe to require nephrectomy. With the establishment of drainage the kidney goes on to almost complete recovery. Renal restoration after colon bacillus pyelonephritis is almost complete. We believe that the most important factor in the prolongation of colon bacillus infection of the renal pelvis is faulty drainage, retention or in other words urinary stasis. Clinically we must recognize that colon bacillus infections in the presence of low urinary stasis such as we find with a ptosed kidney, kinked ureter, strictured ureter, calculus and prostatic obstruction cannot be treated with any hope of success until the obstruction is relieved.

Colon pyelitis is generally a progressive disease in which pyelonephritis is the acute form, pyelitis and pyelonephritis, its chronic, and pyonephrosis, a destroyed surgical kidney the end result.

The study of colon bacillus pyelitis and its acute form pyelonephritis, is hampered by the chronicity of the disease. Rarely is it possible for the physician who sees pyelitis at its acute onset to follow the case until the end of its or the patient's life. It often happens that the physician who sees acute pyelitis loses his patient because he fails to produce a speedy cure. If the condition becomes chronic the patient may pass from one doctor to another or if the symptoms are not too severe neglect treatment entirely until years later he reaches the urologist who makes a diagnosis of a destroyed surgical kidney and does a nephrectomy. Another obstruction to progress is the unwillingness of patients to undergo extensive cystocopic study or treatment for a disease which is not often fatal, not disqualifying except during exacerbations and in which the results of treatment are often not quickly apparent. Even though the patient is warned that neglect may mean the loss of a kidney in the end, that end is remote. We believe that now with a much improved cystoscopic technique and more advanced laboratory and x-ray facilities it is possible to obtain a proper conception of the many predisposing factors in the course of colon bacillus infections of the kidney, that deductions made from collected observations in many cases over a space of time all preferable to a study of a very small group of cases from inception of the infection to the cure or death of the patient. In the history of many of these people ten to fifty years elapses from the onset of the pyelitis until the condition is cured, pyonephrosis develops or the patient dies.

Examination of bladder urine, ureteral catheter specimens with cultures, determination of kidney efficiency, blood retention and pyelograms can be of infinite help in settling this problem; and comparison of findings over periods of time will do much to determine results in the treatment of these infections.

There exists among medical practitioners a wide spread belief that acute pyelonephritis is a medical condition requiring urinary antisepsis and symptomatic treatment such as would be given any acute infection; that becoming chronic it is either cured in a few instances by medicine or the hour glass, and that, for the tendency to persist, nothing can be done. We believe that all these conceptions will eventually be proven to be erroneous and that the first principle of treatment is the removal of the urinary stasis, improvement in drainage and finally combating the infection.

Of the common mechanical predisposing causes in colon bacillus infections of the kidney, we find some outside the ureter, as peritoneal adhesions, tumours of the pelvic organs or bowel, including pregnancy, some in the ureteral wall, as acute and chronic ureteritis, stricture of the ureter, kink, and some within the lumen, as blood clots stone and tumours. From the clinical classification we get: Pyelitis of pregnancy, pyelitis of children, especially little girls, pyelitis of abnormally placed kidney, etc.

A close relation between infectious diarrhoea and colon pyelonephritis in infants is well recognized. Intestinal bacteria may be taken up by the lymphatics or blood vessels from ulceration in the mucosa and in the end reach the blood stream to be excreted by the kidneys producing a pyelonephritis. There is no marked difference as to sex in summer diarrhoea, yet there is a marked preponderance of female cases of pyelonephritis. This is probably due to two reasons; a colon vaginitis serves as a portal of entrance and a more movable kidney from the anatomical type of kidney pocket in the female, causing partial retention and affording the organism a medium for growth. This is also true in the case of what we choose to call the bride's pyelitis. The port of entrance to the blood stream for the colon bacillus is the abraded vaginal mucosa and the lack of drainage of the kidney of the patient accounts for the growth of the organism in the kidney. These cases are not at all as some suppose gonorrhoeal infections. The newly married woman who suddenly gets up an intermittent or permanent fever curve for 102-104° with pyuria and costo-lumbar tenderness is generally not suffering from a gonorrhoeal infection but from a colon pyelonephritis.

Another very similar type is what we choose to call the pyelonephritis of old ladies, generally the poorly nourished type. The portal of entrance here is the atrophic vagina and the predisposing cause is lack of drainage from a sagging kidney.

Kidney displacement whether temporary or permanent seems to us to play a very important part in urinary retention and stasis and therefore in the etiology of infections of the renal pelvis.

If those conditions are to be diagnosed and treated early, the profession as a whole must devote more earnestness to the microscopical examination of the urine. Everywhere we hear of the presence of albumin, the boiling of urine, the nitric acid test, all perfectly good in their place, but how seldom we find a report of pus or white blood cells in the urine; indeed, any microscopical report on a urinary examination.

Slight frequency of urination or bladder irritation demands a thorough examination of the urine and more particularly the microscopical findings.

Infection of the urinary tract generally makes itself known by the vesical irritation it causes. Vesical irritation then should mean first of all an examination of the urine and a general physical examination of the patient. Long continued bladder irrigations without examination or diagnosis are always to be condemned.

The following is a brief summary of the findings in the series reported.

PYELITIS

Number of cases.................................200
Sex: Male...................................45%
Female...................................55%
Average age................................36 years.
Oldest.....74 years.
Youngest... 4 years.

Chief Complaints (On admission):
Symptoms referable to Kidney: Pain, aches, etc....52%
Symptoms referable to Bladder: (Frequency, burning, pain and dysuria)..................27%
Symptoms noted in Urine: Haematuria...........10%
Pyuria.:.............. 3%
Urethral Symptoms: Discharge and burning... 2%
Special Symptoms: Chills................. 4%
Vomiting.............. 1%
Pain in Epigastrium..... 1%

History: Pain.................................85%
Frequency..........................83%
Haematuria..........................25%
Pyuria.............................60%
Dysuria............................73%
Chills..............................26%
Sweats..............................23%
Duration from onset to admission 28 months.
Longest 50 years.
Shortest 2 days.

Urine: Clear 4%, Bloody 2%, Cloudy 94%, Acid 93%, Alkaline 7%, Albumin 94%, Sugar 0%, Average Sp. Gr. 1014, Pus 87%. W.B.C. 12%, R.B.C. 17%.

Phenolsulphonephthalein Test. Average:
First hour....................36.3% }
Second hour...................17.4% } Total 53.7%
Highest total..................93 %
Lowest total...................25 %

Types: Anatomical: Bilateral......70%
Unilateral....30% { Right.....16%
{ Left......14%

Special Types:
Pregnancy......10%
Children........ 3%
Brides.......... 3%
Old Age........ 3%

Etiology: (1) *Bacteria*, Colon family........94.5%
Staphylococci.................5.5%
B.Coli-communis............ 68%
B.Coli-communior........... 12%
B.Fecalis Alk............... 6%
B.Acidformans.............. 8%
B.Variant.................. 5%
B.Typhosus................. 1%
(2) *Accessory Causes:*

(A) Urethral: Retention. (1) Small meatus; Adults..37%
Children. 5%
(2) Small urethra. Congenital.... 3%
Scarred from labor.. 3%
(3) Strictures. Males..... 6%
Females... 1%
(4) Prostatism............ 1%

(B) Vesical: Cystocele........................... 3%

(C) Ureteral: *Outside Pressure:* Pregnancy...........10%
Growths as Ca. of Caecum........... 5%
Calcified Glands...... 2%
Adhesions, pelvic operations............. 2%
Inside Causes: Small ureter.......... 6%
Stricture............ 4%
Calculi, Unilateral....15%
Bilateral..... 6%

Inside Ureter: Diverticulum lower end ureter................ 5%

Congenital Causes: Double ureter......1.5%
Irregular kinked ureter.......... 8%
Malposition, Nephroptosis.... 42%
Nephropexy, etc.... 2%

TOXIC: Typhoid.

PERINEPHRITIC ABSCESSES.

Number of cases.................................21
Sex: Male 18
Female.......................... 3
Age: Oldest.........................66 years.
Youngest.......................20 years.
Type: Bilateral........... 2
Unilateral..........19 { Right.............11
{ Left.............. 8

Organism: Staphlococcus Aureus obtained in all excepting two cases.
Catheter specimen showed same organism on culture in 16 cases.
Urine negative to pus in all excepting three cases.

Etiology: All but three cases had history of previous infection. Boils, Abscess of face, Prostatic abscess, Pyorrhoea, Otitis Media, Infected fingers and toes, etc.

(1) One case abscess tended to burrow towards the front.

(2) Two cases subsided, no operation.

(3) The association of a plastic or serous pleurisy.

Renal Tuberculosis..........................100 cases.

Sex: Male...................................60%
Female.................................40%

Average Age..............................33 years
Youngest..............................11 years
Oldest................................64 years

Duration...............................39.5 months
Longest..............................30 years
Shortest.............................1 month

Type: Bilateral Tuberculosis.....................32%
Unilateral Tuberculosis...................68%
Right................................31%
Left.................................69%
Tuberculosis with calculus................ 4%

Treatment of unilateral: Nephrectomy.............75%
General and Bladder Treatment.
Average days in hospital P.O. 20 days. No deaths.

SPINAL DEFORMITY AS A CAUSE OF CARDIAC HYPERTROPHY AND DILATATION*

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In severe cases of scoliosis and kyphosis the capacity of the thorax is greatly diminished. English medical literature is remarkable in the almost complete absence of any reference to the resulting injurious influence on the thoracic viscera and I therefore venture to bring before you four cases of extreme deformity of the thorax resulting in hypertrophy and dilatation of the heart with cardiac insufficiency. Two of these came to autopsy and showed kinking and narrowing of the great vessels, one of the aorta and the other of the pulmonary artery. This feature is so obvious that it is curious that it has escaped notice by so many writers on the subject.

Case 1. Male, 50, admitted to the Montreal General Hospital, November 29th, 1920, with shortness of breath and cyanosis. He has suffered from marked deformity of the spine from early life as the result of a fall at three years of age. He has always enjoyed good health, earning his livelihood as a beggar up to three months ago, when swelling of the ankles set in. This gradually increased involving the thighs and abdomen and was accompanied by dyspnoea. He became unable to lie down or even to sit and was obliged to sleep leaning over a bed.

Present Condition. The patient's head is sunk between the shoulders. There is a marked kyphosis, the dorsal vertebrae forming a large rounded projection, convex from above down and from side to side, measuring 20 c.m. vertically and 25 cm. transversely. Above and laterally this merges gradually with the trunk, but below at the level of the iliac crests it joins the trunk abruptly. Anteriorly there is a corresponding projection on the front of the chest. The depth of the thorax is much increased being 34 cm. from before back with a compensatory lateral compression.

The face is much cyanosed, a feature which is much less marked in the hands. There is marked oedema of the legs as high as the hips and involving the genitalia, abdominal wall and also slight oedema of the arms. He prefers the standing posture leaning over a bed, the cyanosis increasing on sitting. The veins of the neck are prominent and much enlarged. The pulse 96, of good volume and regular. The heart is enlarged, the apex being 10 cm. to the right of the mid line and dullness 5 cm. to the right and 10 to the left of mid-sternum. The sounds are clear with a gallop rhythm at the apex. A few moist rales are heard at the bases and there is free fluid in the abdominal cavity. The urine 1030, free from albumen and sugar. The cyanosis and dyspnoea increased in severity and the patient died ten days after admission.

Autopsy. The body was frozen and cut in traverse sections.

Six vertebrae were cut in horizontal section, forming a projection which extended almost half way toward the front of the chest, which was flattened laterally. Both right and left ventricles showed very considerable grades of hypertrophy and dilation. The transverse aorta (Fig. 1) ran back to the left of the spine where

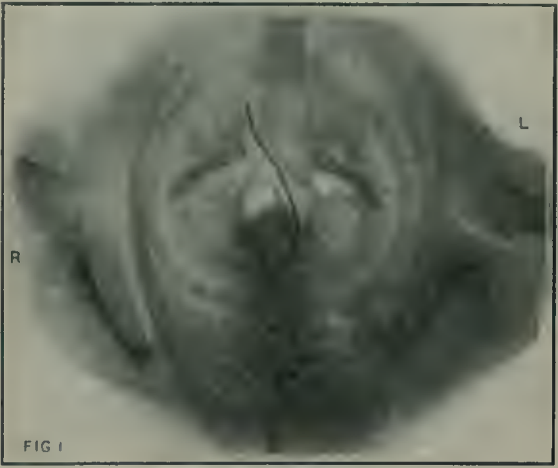

FIG 1

Fig. 1. X-ray photo. of upper portion of thorax looked at from below. A wire shows the course of the transverse aorta and upper part of the descending aorta, the latter passing from left to right along the upper part of the kyphotic curve.

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*Read before The Canadian Medical Association, Halifax, July, 1921.

it turned sharply on itself and passing to the right side of the spine followed the upper part of the kyphotic curve. A second abrupt curve was present at the tip of the kyphosis where the vessel turned forward following the lower portion of the vertebral curve and thence backward over the convexity at the lower end of the deformity. At the first two curves a marked kink with constriction of the vessel was present. The lungs and glands showed no sign of tubercle.

The high grade of constriction in the aorta resulting from its sharp curves as it followed the vertebrae sufficiently explains the hypertrophy and dilation of the left ventricle. The right ventricular changes may be partly explained by chronic pulmonary obstruction, partly by compensatory changes from dilation of the left ventricle.

Case 2. High grade of kyphosis. Pulmonary collapse and compression of the pulmonary artery by extreme curving of the aorta. Hypertrophy and dilation of the right heart.

Male, 27, admitted to hospital October 4, 1909, with great dyspnoea and cyanosis. He has had curvature of the spine since childhood, This developed after whooping cough and he has always been short of breath and subject to occasional palpitation.

Two weeks ago he had an alveolar abscess which broke into the mouth a week ago. His present illness began a week ago with pains in the abdomen and sides, shortness of breath, blueness of the lips, face and fingers and swelling of the feet, also a preference for lying on the side.

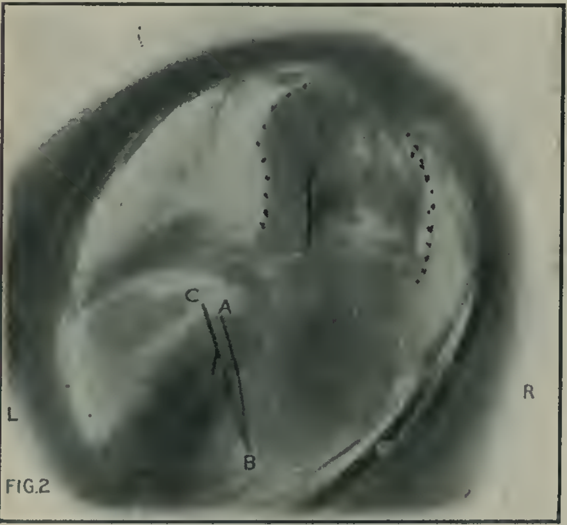

FIG.2

Fig. 2. Shows a wire passed through the ascending arch in front, the dotted line indicating the outline of the heart. Behind the vertebrae cut in transverse section, with the descending aorta passing from left to right, then from right to left and again turning to pass through the diaphragm. The first portion A–B runs along the upper and the second B–C along the lower part of the kyphotic curve.

Present Condition. He lies on the right side. The face and hands show a high degree of cyanosis, being of a deep blue colour. The chest shows great deformity, being convex from above down and from side to side. Behind there is a similar convexity from above down along which the vertebrae cannot be felt. The temperature is 100, pulse 132 small and compressible. The apex is in the fifth space, dullness from mid sternum to 7.5 cm. to the left, sounds are clear. The breathing is laboured and rapid and there are crepitations at both bases. The liver is felt below the costal border and there is slight oedema of the feet. Death occurred two days after admission.

Autopsy, Dr. McLachlan. A poorly nourished and deformed man. There is marked kyphosis of the upper dorsal vertebrae and corresponding lordosis of the lumbar region and a marked pigeon breast. A small quantity of fluid in the serous sacs. The heart weighs 400 gms. The right side is very large and distended with blood and the veins on the surface are also distended. The wall of the right ventricle is hypertrophied and markedly dilated. The left side shows no hypertrophy or dilation.

The aorta follows the course of the kyphosis. There is a sharp angle between the transverse and descending aorta. The transverse running almost directly back along the upper dorsal vertebrae and the descending coming off the tip of the kyphosis and passing forward on the lower dorsal vertebrae. The right pulmonary artery bending beneath the transverse arch is very much compressed. The lower lobe of the right lung is absolutely collapsed and the upper lobe very slightly crepitant. On section the lower lobe cuts with great difficulty and not the slightest degree of crepitus can be elicited. It sinks in water. The left lower lobe is partially collapsed and there is a good deal of congestion present. There is no sign of tuberculosis.

In this case the left side of the heart was unaffected and the sharp turn in the aorta therefore did not offer sufficient obstruction to produce hypertrophy of the left ventricle. The hypertrophy and dilatation of the right side corresponded to the usual type in thoracic deformity and was in all probability due to obstruction in the pulmonary circulation. Compression of the right branch of the pulmonary artery is a condition which I have not found recorded in any published case and it may well have acted as an accessory cause in the production of dilatation of the right heart.

Case 3. High grade scoliosis. Cardiac insufficiency. Cardiographic tracing shows right preponderance.

Mrs. S., 50, admitted under Dr. Gordon with headache, dyspnoea and cyanosis on May 20th, and died June 1st, 1921.

When a year old she had a fall, injuring the back, and did not walk for five years. She has always been a little short of breath but up to four years ago she has always been able to do hard manual work. The dyspnoea then became more noticeable and for the past two years it has been distressing on exertion. After overexertion three weeks ago severe dyspnoea, headache and weakness set in.

Present Condition. She presents an extreme grade of cyanosis in the face and upper thorax, the hands and feet being less cyanosed. There is a high grade of scoliosis, causing a huge convexity over the left scapular and infra-scapular regions, with much increase of the chest from before back.

The relative heart dullness is increased being 4 cm. to the right and 12 cm. to the left of the mid line. A soft systolic murmur is heard at base and apex and the pulmonary 2nd sound is greatly accentuated. Pulse 120, blood pressure 150, diastolic 94. There are numerous fine and medium sized sharp rales at both bases. The liver extends an inch below the costal border.

She continued cyanosed with orthopnoea, and slight oedema set in. The urine showed albumen, but the kidney function estimated by the blood urea and creatinin was normal.

An electro-cardiogram showed marked right preponderance. An X-ray shows a scoliosis convex to the left, the rib spaces being increased on this side and diminished on the right. The heart shadow is indefinite. The vertebrae are compressed in front and on the right side in the area of scoliosis.

In this case the scoliotic curve was on the left side which is exceptional. It corresponds to the usual type of right sided hypertrophy as shown by the increased dullness to the right and the cardiogram. There was no autopsy.

Case 4. Male, 50, admitted March 23rd, 1921, with weakness of the left arm and leg from syphilitic hemiplegia.

He had a fall at a year old and has been deformed since. Apart from frequent attacks of bronchitis he has had good health up to the time of the syphilitic nervous affections.

Present Condition. There is a marked kyphosis of the lower dorsal and lumbar spine. The heart is enlarged, the apex being in the sixth space outside the nipple line. Transverse dullness 3.5 cm. to the right and 11 cm. to the left. The aortic 2nd sound is accentuated, the blood pressure 220, diastolic 122. No albumen and the kidney functions are normal.

Electrocardiogram show a marked left preponderance. Wasserman strongly positive.

Owing to the presence of a syphilitic infection and of a high blood pressure this case is not so conclusive as the others. It was regarded as one of cardiac hypertrophy, probably due to thoracic deformity, with secondary vascular disease.

Like the first case of kyphosis the left ventricle was involved, the cardiogram showing the predominance of this side.

The occurrence of four cases of thoracic deformity—three occurring within a year—associated with cardiac hypertrophy and dilatation indicates that the combination cannot be very uncommon. According to Barie, Delpech in 1828, was the first to record the association of deformity with cardiac symptoms.

All writers on the subject agree that the right heart is much more frequently affected than the left. Bachmann (quoted by Brugsch) in 268 sections of high grade scoliosis or kyphosis found that 66 per cent. showed hypertrophy and dilatation of the heart. Of these 56.4 affected the right heart, 17.5 the left and 25.9 per cent. both sides. In eight cases collected by de Vésian right sided hypertrophy and dilatation was present in all, in three only was there slight hypertrophy of the left ventricle. The cause of the greater incidence of changes in the right heart must be sought in obstruction in the pulmonary circuit and it is therefore necessary to refer briefly to changes in the lungs induced by the deformed thorax.

In both scoliosis and kyphosis the capacity of the chest is diminished. In kyphosis the thoracic cavity is less contracted than in scoliosis, as the convexity of the back, usually accompanied by a corresponding convexity of the sternumonly, lessens the capacity of the thorax in a vertical direction, together with some diminution transversely to compensate for the increased antero-posterior diameter. In scoliosis on the other hand, the lateral curve of the spine, usually to the right, together with the rotation to the same side which is usually present, greatly diminishes the capacity of the right side of the thorax, whilst the left side is contracted by the torsion and deformity of the ribs resulting from rotation of the ribs. Defective capacity of the thorax leads to compression of the pliable lungs, diminishing their aerating surface proportionately to the smaller space they occupy. Stasis and oedema, foci of pulmonary apoplexy and even fibrosis are added to the airless portions of lung, whilst emphysematous changes are almost invariably present in the air containing areas. The rigid thorax, with its defective expansion, still further embarrasses the right heart which loses the normal aid rendered by the respiratory movements, whilst the increased resistance in the pulmonary circuit results in hypertrophy and dilatation of the right heart, sometimes leading to tricuspid regurgitation.

The capacity of the lungs, judged from the inspired air at a full breath, has been found by Wintrich to be lessened by from 20 to 60 per cent. These individuals suffer as de Vésian points out from a normal dyspnoea and from great aggravation of symptoms in bronchitis or other thoracic diseases, a fatal termination being sometimes seen even in a simple bronchial catarrh.

Whilst obstruction in the lesser circulation satisfactorily explains the changes found in the right heart it is obvious that similar changes in the left heart cannot be thus accounted for. De Vésian suggests that congestion in the venous circuit eventually throws an extra strain on the left heart but this can hardly account for any considerable degree of hypertrophy, the right heart giving out before such changes are induced on the left side. That sharp curves may occur in the course of the aorta as it follows the abnormal lines of the spine has long been recognized in both kyphosis and scoliosis, in many cases causing no increased resistance to the greater circulation judging by the lack of compensatory changes in the left heart. Corvisart endeavoured to explain the changes in the heart from obstruction offered by these curves and constrictions in the aorta but unfortunately the changes in his cases were confined to the right heart and his interpretation was obviously erroneous. In a case of Lafont's the aorta was narrowed throughout its whole course in a scoliotic without producing hypertrophy of the left ventricle. It would therefore appear that considerable grades of deformity are necessary before inducing changes in the left heart.

Excluding other causes of hypertrophy, particularly nephritis and arteriosclerosis, there remain a large number of cases of left sided hypertrophy for which no satisfactory explanation has been hitherto given. Judging from the conditions found in my first case it seems probable that in some if not in all such instances the narrowing caused by abrupt curves in the aorta offers an increased resistance to the left heart and is the most obvious and satisfactory explanation of hypertrophy and dilatation of the left ventricle.

In minor degrees of scoliosis Brugsch has brought forward evidence to show that cardiac changes may be present. In a series of cases in children palpitation and rapid action of the heart on exertion were frequent manifestations. By means of Röntgen pictures he found that the heart assumes the mitral configuration, a form also present in aplastic conditions due to lack of exercise. Much benefit was obtained both in spine and heart from the creeping exercises of Klapp. The possible development of cardiac disease is a strong argument for the early and efficient treatment of cases of spinal deformity.

The most striking feature in the advanced cardiac cases is cyanosis, which affects chiefly the head and upper extremities and is often less marked in the lower parts of the body. The cervical veins stand out prominently and when tricuspid regurgitation sets in there may be added the usual features of that state. Dyspenoea in the earlier stages is to be attributed to the diminished aerating surface of the lungs, but even here as Brugsch's observations indicate it is also partly cardiac. In the advanced stages it becomes extremely urgent, being more or less constant and with paroxysmal exacerbations. Relief is sought in assuming the erect posture, in leaning forward, or as in one of my cases by kneeling and leaning forward on a chair.

Oedema of the legs and serous cavities is usually present in varying degrees depending doubtless on the degree of insufficiency of the right heart.

Although cardiac failures is usually a gradual process extending over months or even several years, a rapid termination occurs in some cases after the onset of symptoms. In my second case only ten days elapsed between the onset of symptoms and the fatal termination.

It is well recognized that individuals with much thoracic deformity seldom attain old age. Most of them are carried off by pulmonary complications to which cardiac changes are an important contributory cause. Cardiac disease is responsible for no inconsiderable number of deaths occurring about middle life and often carrying the patient off before attaining an age much over fifty.

Treatment in advanced cases can only be symptomatic and is then often usually futile. To avoid such conditions by early treatment of the spinal affection forms our only efficient method of action.

GANGLION OF THE WRIST REGION WITH REPORT OF TWO CASES SHOWING DESTRUCTIVE TENDON INVOLVEMENT

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TWO distinct types of ganglion are of frequent occurrence in the neighborhood of the wrist. (a) The simple circumscribed non-tuberculous ganglion, (b) The compound or diffuse tuberculous ganglion. The two conditions are sometimes confused, although both clinically and pathologically they are quite distinct. The simple ganglion is a rounded semi-fluctuating swelling varying in size from a pea to a small walnut, which may appear almost anywhere in the neighborhood of the wrist but is most frequently seen on its radial side. It consists of a fibrous cyst wall with an endothelial lining; its contents are translucent, jelly-like in consistence and in appearance not unlike white of egg. The tumor, when grasped through the skin, can be moved slightly, but the underlying tendons, when put into action move independently of it.

These small cysts are intimately connected with the fibrous coverings of tendon sheaths, or with the ligaments of the wrist or carpal joints, and may communicate with the interior of a sheath or of a joint cavity. Sometimes they seem to result from a sprain or other injury, and are frequently observed in musicians or persons following occupations requiring habitual overuse of the muscles controlling the wrist and fingers. They are more commonly seen in females than in males.

Opinion varies as to the mode of origin of the simple ganglion. The most reasonable explanation is that originally it is a pouch-like protusion from a tendon sheath or from the wrist or one of the carpal articulations, the synovial membrane gradually protruding through some weakened portion of the fibrous envelope within which it lies; the protrusion gradually enlarges, becoming a cystic tumor lying on the fibrous coverings of the tendon or joint but not necessarily communicating with the synovial cavity from which it originated.

The simple ganglion occasions a feeling of weakness and discomfort rather than actual pain; the patient is conscious less of suffering than of slightly diminished efficiency.

The compound diffuse ganglion is a totally different affection and almost invariably represents a chronic tuberculous process affecting the tendon sheaths. While it sometimes attacks the sheaths of the extensor tendons, it is seen much more frequently on the volar aspect of the wrist and lower part of the forearm, extending beneath the anterior annular ligament into the palm.

On examination one finds a fluctuating swelling on the front of the wrist extending downward into the palm and upward a variable distance in the lower part of the forearm. On manipulating the swelling a characteristic soft crepitation is felt and it is apparent that a portion of the contents of the swelling can be pressed upward and downward beneath the anterior annular ligament.

When the swelling is opened it is found to be crowded with small "melon-seed" or "rice" bodies. These are very numerous and of variable size. They are of a whitish colour and have a smooth polished surface. It is the movement of these particles upon one another and upon the limiting walls of the tumor which causes the characteristic crepitation referred to as occurring when the swelling is manipulated or the wrist and fingers are voluntarily flexed and extended.

Treatment

There is but one certain and satisfactory treatment of either the simple or the compound ganglion—complete extirpation by careful dissection. At one time it was a common practice to rupture a simple ganglion by pressure with the thumbs or by a sharp blow, but such crude and unscientific practice should not be countenanced. Neither should reliance be placed upon the timid and uncertain method of evacuating the contents of the swelling by puncturing it with a tenotome, expressing its contents and then attempting to produce adhesion of the walls of the cyst by blindly scarifying its interior and applying a pad and bandage. Cures have been brought about by the use of an aseptic seton, but one seldom sees this method used at the present time. Under strict aseptic precautions, and after the part has been rendered bloodless, the swelling should be exposed and delicately dissected away from surrounding tissues. Usually it will be found that the ultimate boundaries of the tumor are much deeper and more extensive than would be suspected from its external appearance, and in some cases the attachments must be followed deeply into the radio-carpal joint or between the carpal articulations. By patience and care the tumor can be completely removed and quite frequently this may be accomplished without puncturing its walls.

In operating on the large tuberculosis ganglion a minute knowledge of the anatomy of the part, and uncompromising thoroughness in the removal of every vestige of diseased tissue are essential to success. If the disease be extensive, involving the palm and extending well above the wrist, the surgeon may have to work industriously for two hours before the operation is complete. A bloodless field saves a great deal of time and renders the operation easier and more thorough, and in order to secure this with a minimum risk of "Esmarch bandage paralysis" I have found the following method very useful:

Two pieces of soft rubber tubing, three-eighths to half an inch in diameter and a foot in length are boiled with the instruments. After a final painting of the hand and arm with iodine an assistant elevates the extremity for a moment by grasping the fingers with one hand while two or three fingers of his other hand are applied to the patient's radial artery. Then the surgeon makes two or three turns of the rubber tube around the arm three or four inches above the elbow, and gradually draws the tube just tight enough to obliterate the radial pulse, the assistant informing him when the pulse can no longer be felt. When in the surgeon's opinion the operation is about half complete the second tube is applied to the forearm a short distance below the elbow, after which the upper tube is removed. This simple procedure reduces by fifty per cent. the time during which any one portion of the nerve trunks is subjected to pressure by the tourniquet, thus greatly lessening the risk of muscular paralysis.

It is impossible to lay down strict rules as to how the dissection shall proceed; in a general way it is wise to follow as closely as is possible the natural creases in the palm. Complete removal of diseased tissue with a minimum of injury to healthy tissues must be the guiding principle throughout. An incision starting midway between the elbow and the wrist is carried down along the middle of the anterior surface of the forearm, and after crossing the wrist is continued along the palmar boundary of the thenar eminence to the base of the thumb, and then along the palmar surface of the thumb to within an inch of its end. A second incision is then carried from the base of the little finger along the palmar boundary of the hypothenar eminence so as to intersect the first incision at the point where the latter begins to curve towards the thumb; together these incisions will permit the raising of flaps sufficiently extensive to give all the exposure required for most cases. If necessary, however, the disease must be followed into the individual digits.

With the tissues bloodless no difficulty will be experienced in distinguishing the diseased from the healthy tissues; the greatest care and delicacy must be exercised so as not to injure the nerves in the palm of the hand. The vessels of the superficial palmar arch will be sacrificed, but the deep palmar arch need not be injured.

No hesitation need be felt about completely dividing the anterior annular ligament, and it is impossible to do the operation thoroughly without cutting this structure.

My personal preference is to complete the palmar dissection first, and then follow the disease into wrist and forearm region, and should the disease be found to involve the muscles of the forearm the operator must not feel satisfied until every vestige of suspicious muscular tissue has been extirpated. Not only must the diseased sheath be thoroughly removed, but the tendons themselves must be carefully examined. It is an astonishing fact that such masses of tendons as those on the flexor and extensor surfaces of the wrist may for years glide up and down through the pulpy mass of tuberculous tissue in which they are embedded without showing the slightest evidence of disease, their smooth glistening appearance and tensile strength being fully maintained. So usual is this that one is apt to forget the well established fact that the tendons themselves may finally fall a prey to the destructive process. After first gaining a foothold on the surface of the tendon the granulation tissue gradually insinuates itself between the bundles of fibrous tissue, disintegrating and weakening them until finally the continuity of the tendon is interrupted. In the two cases reported in this paper it was noted before operation that the patient was unable to flex the terminal joint of the thumb, a fact which was easily explained at the operation, as in that portion of the tendon of the flexor longus pollicis which is hidden by the thenar eminence there was found an actual gap over one inch in length, the proximal and distal remains of the tendon on each side of this gap appearing as soft, attenuated, dirty yellowish cords with pointed ends. In the first case several of the tendons of the flexor sublimis were similarly diseased.

If only the surface of a tendon is diseased, a thin slice, which includes all the pathological tissue, can be removed from the tendon by a sharp knife, but in the exceptional cases, where the tendon has been destroyed, one has no choice but to remove all the diseased tissue at the expense of subsequent impaired function.

After controlling hemorrhage the annular ligament should be carefully sutured with catgut and the skin edges brought together very accurately with silkworm gut. A dressing is then applied with the hand in such position as to relax the tendons on the side operated upon; thus if the operation has been on the palmar tendons the wound will be dressed with the hand in a flexed position, and vice versa, the object being to make it easier to stretch or break down any adhesions which may follow the operation.

Very gentle passive movement may be begun about the third day and should be carried out once daily afterwards. After complete healing has occurred, which may take ten to fourteen days, radiant heat, massage and systematic exercises will assist in restoring function.

Results of Operation

Provided that the operation has been sufficiently thorough and the wound remains aseptic, the results of the operation are usually most gratifying. It seems incredible but is nevertheless true, that after extensive operations of the kind outlined, practically complete functional restoration is the rule. Cases have been reported where after complete extirpation of a large palmar ganglion a patient who was able to play the piano or violin could resume his practice without inconvenience.

F. P., 26 years. Farmer. History of trouble in his left hand and wrist extending back fifteen years. It had been gradually getting worse and interfered very much with his work. He did not suffer acute pain but the hand was very inefficient and he was compelled to use it guardedly. On examination a large swelling was found occupying the lower third of the volar surface of the forearm and the palm of the hand, which was also much swollen, particularly in the neighbourhood of the thenar eminence and the base of the thumb. Voluntary movements were not particularly painful. When the swelling was manipulated it was found to be soft and semi-fluctuant, and the peculiar characteristic crepitation produced by the "rice bodies" of a tuberculous palmar ganglion was very pronounced.

At operation the swelling was found to consist of an envelope of thickened synovial membrane filled with a small amount of fluid and innumerable "rice bodies." In order to remove all the diseased tissue it was necessary to make a complete dissection of the palm of the hand and of the forearm half way up to the elbow, which was done in the way already indicated. The long flexor tendon of the thumb, and also several tendons of the flexor sublimis had been so far destroyed that their continuity was interrupted.

There was primary healing throughout. Patient was encouraged to use the fingers voluntarily even before the sutures were removed. At the end of two weeks treatment by radiant heat and massage was begun. The function of the hand improved very rapidly and the patient left for his home in three weeks.

Mr. J. S., 30 years. Male: History of discomfort and gradually increasing swelling in the right hand extending back about eight years and gradually getting worse. Clinically the case was practically identical with case No. 1. Patient was unable to flex the terminal phalanx of his thumb, but the function of the other fingers appeared to be unimpaired. The operation was practically the same as in case No. 1, except that no removal of the sublimis tendons was required as they were free from disease.

On carefully following the tendon of the long flexor of the thumb its continuity was found interrupted just proximal to the metacarpophalangeal junction, and for about one inch on either side of this point the tendon was represented by a soft, yellowish, sloughy pointed cord. In this case, after removing the diseased portion of tendon an attempt was made to restore continuity by turning down a long slender strip from the healthy proximal portion of the tendon and uniting it to the healthy distal stump of the tendon, but the subsequent history showed that this attempt was attended with little success.

After completely extirpating the diseased tissue from both the palm of the hand and the lower half of the forearm, the wound was closed after arresting hemorrhage, and subsequent treatment carried out largely as described in case No. 1. The functional result was excellent.

THE CAUSE OF THE "AMMONIACAL DIAPER"

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ALTHOUGH the "ammoniacal diaper" has recently been the subject of considerable discussion on this continent, there still seems to be a good deal of uncertainty as to its cause and of a consequence there is a lack of definiteness and confidence in its treatment.

In beginning an investigation of this condition, one was soon impressed by the fact that there were practically no instances of it within the wards of the hospital although such cases were being constantly met with in private practice throughout the city, and in spite of the fact that mothers coming to the Out Patient department frequently reported the existence of this trouble in their infants. Sometimes it was merely the strong odour for which they sought a remedy, one saying that the other children called the baby the "ammonia factory," another that the "bed room smelled strongly of ammonia, and that on removing the diaper in the morning it was like opening an ammonia bottle, making the eyes water." Frequently, even if no other symptoms had developed, the mother was found to fear that something must be wrong with the baby, although healthy and doing well. Perhaps more often the children were brought because of a rash which has been so well described by Zahorsky[1] in his admirable article upon the "ammoniacal diaper." This rash has a distinctive appearance. It is confined to the diaper region and appears characteristically as an eruption which has been vesicular but in which the vesicles have broken and dried, giving the picture of small superficial but punched out ulcers with a dry parchment-like covering and frequently, with indurated margins. It is usually most intense over the buttocks and back where the child has been lying upon the diaper but the anterior surface of the abdomen and inner surfaces of the thighs which have been in contact with the diaper also exhibit the condition. The rash, however, may not be so well marked as in the description, and may vary in degree from slight redness, to vesiculation, or to the more frequently seen eruption described above.

Another, by no means uncommon reason for mothers seeking advice, was the ulcerated meatus which sometimes follows circumcision. This is mentioned by Zahorsky, and is fully described by Brenneman[2] in a recent article: Briefly described, this condition usually commences as a blister, seldom seen unruptured, at the meatus, which leads to ulceration, painful urination, crusting over of the meatal opening, at times hæmorrhage, and frequently a distended bladder. Occasionally a mother came to ask what she could do to remedy the odour which came from the bed of a child troubled with enuresis.

Observations

Despite the frequency of the condition outside the hospital only two cases of it occurred in the wards over a period of three months. In the first case the nurse noticed and reported a slight but distinct smell of ammonia on the diaper in the morning. A fresh specimen of urine was collected in a sterile container. It was noticed to be slightly opalescent. A very faint odour of ammonia was thought to be detected coming from the urine in the container although in the cases investigated later it was not possible to detect ammonia from the urine in a vessel. The uncentrifuged specimen showed under the microscope numerous bacilli with about two pus cells to a high power field. A day or two later a catheter specimen was markedly opalescent and revealed many bacilli with eight to ten pus cells to a high power field in the uncentrifuged specimen. From this specimen, a culture was made which grew pure bacillus coli. No micrococci were grown in culture. It is interesting to note that in this case the odour of ammonia was noticed on the diaper at an early stage in the pyelitis, which was found to be present when there were only about two pus cells to the field and when it was difficult indeed to make the later determined diagnosis. Zahorsky states that the ammoniacal diaper is a frequent precursor of pyelo-cystitis in female infants. In this child, a female, the odour which first appeared after the child had been in hospital some time was coincident with a marked bacilluria and the evidence in this case was certainly that the bacilli were producing the ammonia. In the second hospital case another female infant, a faint smell of ammonia was noticed on the diaper in the morning. A specimen of urine was collected as soon as possible and was found to be swarming with motile rod-like bacilli. There were no pus cells present. A catheter specimen was clear and contained neither bacilli nor pus cells. After thorough cleansing of the external parts the condition did not recur. In this case the contamination evidently came from the external parts.

There were two facts about the occurrence of the ammoniacal diaper that seemed very significant. First there were very few cases within the wards of the hospital. Secondly, although the children were admitted with a constant history of an ammoniacal diaper, and although frequently they were kept on the same feeding, the condition did not occur in hospital. These observations seemed to be strong evidence that the trouble arose from an external factor and not from any error in metabolism. About this time appeared Brenneman's article reviewing Zahorsky's work, giving further support to the idea of an external factor being the cause, and suggesting further that it was largely an alkali in the diaper. In order to investigate this possibility, two diapers were taken, one an ordinary hospital diaper which had been washed and sterilized in the usual hospital manner, and another similar diaper washed with a well known widely used preparation of soap flakes, and incompletely rinsed so as to leave some soap in the diaper. To each was added 30 c.c. of urine from a normal healthy adult. The diapers were wrapped separately in rubber sheeting and left in the incubator at body temperature for three quarters of an hour. On removal of the packages from the incubator and on unwrapping the rubber sheeting a strong odour of ammonia came from the diaper washed with soap flakes while the hospital diaper gave off no odour whatever.

Following another line of investigation urines were collected from children of different ages who were on the feedings shown in the following table. The ammonaia was determined and computed for 25 c.c., using the Van Slyke and Cullen aeration apparatus. Twenty-five c.c. of urine was then added to diapers which had been washed with washing soda and incompletely rinsed. The diaper was wrapped in rubber sheeting and left in a warm place for thirty

Observations on Children under Three Months of Age

Case	Age	Feeding Percentages of Fat Carbo-Prot. Hydrate	Quantity	Treatment of Diaper	Odour of Ammonia after ½ hr.	Effect on moistened red litmus paper	Grams of Ammonia in 25 c.c. of urine
K–	1 mth.	4, 7, 1 (Artificial)	2½ ozs. q3h x 7	Washed with washing soda and incompletely rinsed, 25 c.c. urine added, wrapped in rubber sheeting and left on warm radiator thirty minutes	No odour	No action	.00238
L–	6 wks.	4, 7, 1 (Artificial)	2 ozs q3h x 7		“ “	“ “	.0076
N–	14 dys.	4, 7, 1 (Breast)	....		“ “	“ “	.0034
G–	7 wks.	4, 7, 1 (Breast) remainder made up 4, 7, 1 (Artificial)	6-8 ozs. 2 ozs. q3h x 7		Very slight odour	Ft. blue	.00807
H–	11 wks.	.7,1.1, 1.2 (Artificial)	3½ ozs. q3hx5		“ “	“ “	.0068
T–	14 wks.	.7, .7, 1.6 (Artificial) 4, 7, 1 (Breast)	4 ozs. q3h x 7 6-10 ozs.		“ “	“ “	.00425
H.K.–	9 wks.	.7, .7, 1.6 (Artificial)	3 ozs. q3h x 7		No odour	No action	.00297
R.K-	9 wks.	.7, .7, 1.6 (Artificial)	3 ozs. q3h x 7		Very slight	Ftly. blue	.0051
W-	9 wks.	1.4, 6.25, 1.6 (Artificial)	3 ozs. q3h x 7		No odour	No action	.0038
C–	9 wks.	4, 7, 1 (Breast)	....		Ft. odour	Ftly. blue	.0127

Observations on Children from 3 to 20 Months

Case	Age	Feeding Percentages of Fat Carbo-Prot. Hydrate	Quantity	Treatment of Diaper	Odour of Ammonia after ½ hr.	Effect on moistened red litmus paper	Grams of Ammonia in 25 c.c. of urine
P-	10½ mths	3, 5.8, 2.8 (Artificial)	8 ozs. q 4 hx5	Washed with washing soda and incompletely rinsed, 25 c.c. urine added, wrapped in rubber sheeting and left on warm radiator thirty minutes	Distinct	Marked	.01105
H–	8½ mths.	4, 7, 1 made up to 40 ozs. in 24 hrs. by artificial mixture 3, 5.8, 2.8.	16 ozs.		“	“	.00935
R-	4½ mths.	4, 7, 1 (Artificial)	3 ozs. q3h x 7		“	“	.017
R–	4½ mths.	4, 7, 1 (Artificial)	3 ozs. q3h x 7		Quite strong	“	.020825
D.H.–	20 mths.	Full diet for age	....		Distinct	“	.0102
S–	18 mths.	3, 5.8, 2.8 (Artificial)	8 ozs. q4h x 4		“	“	.01615
P–	18 mths.	2, 4.5, 3.5 (Artificial) Cereal Milk Mixture	8 ozs. q4h x 5 1 oz. T.I.D.		“	“	.01317
P–	3 mths.	1.6, 8.4, 2.8 (Artificial)	4 ozs. q4h x 6		“	“	.01445
S–	16 mths.	3, 9.8, 3. 5(Artificial)	8 ozs. q4h x 6		“	“	.0225
C– . . .	3 mths.	.7, .7, 1.6 (Artificial)	4 ozs. q3h x 5		“	“	.01487

Observations on Older Children

Case	Age	Feeding	Medicine	Treatment of Diaper	Odour	Effect on moistened red litmus paper	Grams of Ammonia in 25 c.c. of urine
S-	5 yrs.	Soft diet	None	Washed with washing soda and incompletely rinsed. 25 c.c. urine added, wrapped in rubber sheeting and left on warm radiator thirty minutes	Ammoniacal	Turns blue	.0306
R–	7 yrs.	Full hospital diet	“		“	“ “	.017
K–	11 yrs.	“ “ “	“		“	“ “	.0157
K–	11 yrs.	“ “ “	“		“	“ “	.0140
B–	12 yrs.	“ “ “	“		“	“ “	.00935
O–	7 yrs.	Cardiac (baked potatoes, steak, custard, chicken)	Sod. Sal. 12 grs. Sod. Bicarb. 24 grs. q4h x 5		Faintly ammoniacal	Turns ftly. blue	.0085
G–	6 yrs.	Soft diet	Sod. Sal. 8 grs. Sod. Bicarb. 16 grs. q4h x 5		“ “	“ “ “	.0097
L–	12 yrs.	“ “	Sod. Sal. 15 grs. Sod. Bicarb. 30 grs. q4h x 5		Very faintly ammoniacal	“ “ “	.0055
V–	8 yrs.	“ “	Sod. Sal. 10 grs. Sod. Bicarb. 20 grs. q4h x 5		“ “ “	“ “ “	.00467

minutes. The odour and the effect on moistened red litmus paper, held above but not in contact with the diaper immediately the rubber sheeting was unwrapped, were noted and recorded. Washing soda was used in preference to soap because it facilitated the maintenance of a more uniform condition in the diaper throughout the observations. The aim was to leave the diaper no more strongly alkaline than it might easily be if washed with soap.

It will be noted from the tables that in practically all the cases where the children were on a fairly liberal diet and were over three months of age, ammonia was given off from the diapers in sufficient quantity to give a definite odour and to turn moistened red litmus paper blue. In most of the infants under 3 months of age, as seen in Table 1, the quantity of ammonia excreted as ammonium salts was so small that the odour was either not detectable or only faintly so, and the action on litmus was slight. The fact that the ammoniacal diaper is seldom observed in the very young infant can be accounted for by the fact that their excretion of ammonia is so small that even if the external conditions are such as to liberate this ammonia its quantity is not sufficient to attract attention. Similarly if the diet is so low that ammonium salts are excreted in small amount the ammonia odour is not noticed. This accounts for the results obtained by some clinicians when they use a gruel diet as a means of treatment for the ammoniacal diaper. However, if we recognize that the factors which cause the breaking down of these ammonium salts and the liberation of free ammonia are due to external factors it will be self-evident that the treatment of the condition by partial starvation is an unnecessarily severe as well as an irrational treatment, although there is no doubt that it will temporarily get rid of the trouble so long as the food is kept low enough. It will be noticed from Table 3 that the excretion of ammonia as ammonium salts is higher in the older children, except in those cases who were having large doses of soda bicarbonate and sodium salicylate. In the latter cases the smell of ammonia from the diaper was slight. This is only what one would expect from the fact that, other things being equal, alkali intake decreases the excretion of ammonia and is contrary to Zahorsky's observation that alkalies have no effect upon the ammoniacal diaper. Clinically we have often found that on the administration of large doses of potassium citrate the ammoniacal diaper has disappeared, this of course is simply due to the fact that the ammonia excereted as ammonium salts is so low that the odour is not detected. Personally, I have not found any cases in which the administration of alkalies aggravated the condition. I can, however, quite believe that if there were still enough ammonia being excreted as ammonium salts and the external factors were present to liberate it that the condition might still persist while alkalies were being administered.

Although it seemed self-evident that the administration of alkalies would decrease the excretion of ammonium salts in the urine, yet in order to test it urines were collected from three children and the ammonia was estimated. They were then given potassium citrate 20 grs. for three doses. The urine was collected at approximately the same time of day following the administration of potassium citrate and the ammonia again estimated. As will be seen by the table, the results show a lowered excretion of ammonia as ammonium salts in all cases, although the potassium citrate was given for such a short period.

Case	Age	Feeding percentages of Fat, Sugar Prot.	Ammonia in grams from 5c.c. urine	Ammonia in grams from 25 c.c. urine	Ammonia in grams from 5 c.c. urine after giving potassium citrate 22 grs. q4h for 3 doses	Ammonia in grams from 25 c.c. after 3 doses potassium citrate.
W–	6 mths.	4, 7, 1 (Breast), supplemented if necessary by artificial mixture 12, 4.7, 1.80, 8 ozs. q4h x 5.	.0017	.0085	.0014	.007
S–	9½ mths.	3.3, 3.7, 3, 8 ozs. q4h x 5. Cereal Milk Mixture 1 oz. t.i.d.	.00102	.0051	.00085	.00425
C–	10 wks.	4, 7, 1 (Breast), supplemented if necessary by artificial mixture 2, 5.7, 2.1, 4 ozs. q3h x 7.	.00233	.01165	.00025	.00125

In order to test for the quantity of ammonia which would come off from urine with diapers treated by washing in washing soda and incompletely rinsed a square portion was removed from a diaper so treated, and was placed in a Van Slyke and Cullen's aeration tube, 10 c.c. of urine were added. The tube was quickly corked, connected up to the tube containing n/20 HCL for taking up the ammonia and a clamp placed on the rubber tubing connected with the aeration tube so that no ammonia could escape. This was allowed to stand in a warm place beside the radiator for one hour as had been the procedure with the diapers in the first experiment. Aeration was then carried out in the usual way and the amount of ammonia estimated. Ten c.c. of a half saturated solution of potassium carbonate was then added to the tube and aeration carried out again. At the same time the ammonia content of another sample of the same urine was estimated using the Van Slyke and Cullen apparatus in the usual way. It will be seen from the first table that 35 to 53.7% of the total ammonia came over from the diaper alone and the aeration was necessarily very imperfect as there was not sufficient fluid to get even approximately complete aeration. In the experiment reported in the second table 20 c.c. of distilled water were added in order to have better aeration. It will be noted that the percentages of ammonia recovered from the diaper and urine without added alkali and the total percentages recovered are much higher although even here the conditions for aeration were not perfect, as the cloth had to be packed down into the bottom of the tube so as to have fluid above through which to aerate. These tables show, however, that a large percentage of ammonia comes off from the urine on a diaper which has been washed with washing soda and insufficiently rinsed.

TABLE 1

Case	Ammonia from 10 c.c. of Urine	Ammonia from Diaper roughly rinsed and 10 c.c. of Urine	Percentage recovered from Diaper and Urine	Ammonia from Urine and Diaper after adding 10 c.c. of half saturated sol. Pot. Carb.	Total Ammonia recovered	Total percentage recovered from Diaper and Urine and Pot. Carb.
	Grams	Grams		Grams	Grams	
R–	.01122	.005695	50.7%	.002635	.00833	74.2%
R–	.00357	.001785	50%	.00102	.002805	78.6%
W–	.00649	.003485	53.7%	.0018	.005285	81.4%
B–	.0034	.00119	35%	.00102	.00221	65%

TABLE 2

Case	Ammonia from 10 c.c. of Urine	Ammonia from Diaper washed in washing soda and roughly rinsed, plus 20 c.c. distilled water and 10 c.c. Urine	Percentage recovered from Diaper and Urine	Ammonia from Urine and Diaper plus distilled water after adding 10 c.c. half saturated Pot. Carb.	Total Ammonia recovered	Total percentage recovered from Diaper and Urine and Pot. Carb.
	Grams	Grams		Grams	Grams	
W–	.002890	.00221	76.4%	.000425	.002635	91.1%
A–	.00799	.0044	55%	.00178	.00618	77.3%
C–	.00238	.00102	43%	.000765	.001785	75%
Mc–	.00289	.002125	73%	.000595	.00272	94%
P–	.01122	.004675	41.6%	.004335	.00901	80.3%

Despite the fact that the profession as a whole do not seem to have accepted Zahorsky's idea that the ammoniacal diaper is due to alkali left in it (probably owing to the fact that he offered no proof) it became more and more evident to the author that this was the principle factor in the production of this troublesome condition. All of several cases from the out patient department had responded to thorough rinsing of soap from the diapers, although in one or two of them it was necessary to impress the mothers on their second visit with the importance of seeing that this was done with each and every diaper. Concerning two cases the mothers reported the condition as better but that there was still some odour. However, after duly impressing them with the minor points and getting their co-operation we had the satisfaction of seeing the conditions clear up in all cases after thorough rinsing, and in a few cases after boiling the diapers.

About this time a friend in practice enquired what he could do for a little patient who had a rash on the buttocks, and from whose diapers persistently came such a strong smell of ammonia that the room reeked of it. It was suggested that a less alkaline soap be used and that careful supervision of the rinsing be carried out. Ten days later it was reported that the condition had entirely disappeared. The strong smell of ammonia ceased at once upon treating the diaper. The rash which had been quite bad subsided without receiving local treatment. A month or two later it was reported that the odour was back again. This time the bed was the worst offender. It was advised that the bedding and pad be treated as were the diapers and that all be thoroughly boiled on the chance that contaminating micro-organisms present might be a factor in causing the ammoniacal odour. The mother, who herself supervised the washing and boiling, reported that all the offensiveness disappeared as soon as this was done. This case has been carefully watched up to the present and there has been no return of the condition.

The following cases are of interest:—

Case 1. A.P., male, age 1 year. Came to O.P.D. February 10, 1921. The mother had noticed for some time a strong smell of ammonia on changing the diaper. This was most marked in the morning or if there has not been an opportunity to change diapers at the usual time. The mother had been washing the diapers with a preparation of soap flakes. She was advised to change the soap and to rinse the diapers thoroughly in four waters.

February 14, 1921. No smell of ammonia since diapers have been carefully rinsed. Specimen urine examined shows:

Ammonia per 100 c.c.	.0153 gms.
Ammonia from urea ammonia per 100 c.c.	.306 gms.

Ammonia urea ratio—1 : 19

February 17, 1921. Since last visit only one diaper on which ammonia could be detected, and that only faintly so after 4½ hours in park where it could not be changed.

Case 2. R.M., male, age 9 months. Came to O.P.D., February 16, 1921. Family history nil. Personal history. Has had discharge from both ears since Christmas. Brought to hospital because of rash on the buttocks and sore at the margin of the foreskin which commenced as a small blister but is now a small ulcer. The mother has noticed a strong smell of ammonia on the diapers for some time but is not certain how long. She thinks two or three months. The diaper has been ammoniacal every time she changed it. Fed on condensed milk until eight months old. When brought to O.P.D. one month ago put on skim milk 25 oz., water 15 oz., lactose ½ oz. 8 oz. q. 4h x 5. Odour disappeared for about one week. Then fed skim milk 30 oz., water 10 oz., dextro maltose ½ oz. 8 ounces q. 4h x 5. Cereal milk mixture 2 oz. t.i.d., and is now having skim milk 40 oz., dextro maltose 2 oz.—8 oz., q. 4h x 5. Cereal Milk Mixture 2 oz. t.i.d. Cod Liver Oil and Malt 10 m. t.i.d. After the first week of attending hospital, during which the odour of ammonia disappeared, the infant improved and has been getting stronger as the food has been increased.

Urine—acid

Ammonia in 100 c.c.	.0272 gms.
Ammonia from urea and ammonia in 100 c.c.	.714 gms.

Ammonia Ratio 1 : 27

Acidity 2.2 n/10 alkali to 10 c.c.

February 23rd. As instructed the diapers have been washed with a good laundry soap and well rinsed. There has been practically no odour of ammonia from the diapers and if any it has only been in the morning after the diaper had been on all night. Rash has entirely disappeared and ulcer is healed. There has been no local treatment. Child needs circumcision.

March 27th. There has been no return of rash and no smell of ammonia from the diapers.

Case 3. D.H., female, age 20 months. Referred on account of ill-smelling diapers. February 16th, 1921. Breast fed 6 weeks, then Eagle Brand Condensed Milk according to directions. Is now having same diet as the family. Has had a rash over diaper region which first appeared for 4-5 months as little blisters. Has had a strongly ammoniacal diaper for 4-5 months. "It is so strong in the morning that it almost chokes you." Otherwise child is strong and healthy. In washing the diapers the mother has always used an ordinary laundry soap, rinsing them once afterwards. Mother instructed to rinse the diapers four times after washing.

February 21st, 1921. Much better. Occasionally slight smell of ammonia in the morning or after the diaper has been on a long time. The rash is disappearing. To boil diapers.

February 24th, 1921. Scarcely ever any smell of ammonia now. Rash almost gone.

Case 4. I.H., female, age 7 months, sister of case 3. Referred on account of ill-smelling diapers, February 16th, 1921. Being fed on cow's milk 4½ oz., water 2 oz., q. 4h. x 6. Has had a rash over the diaper region for 3 or 4 months. The diaper has smelled of ammonia for about the same length of time but not nearly so strongly as did the diapers of the older child. February 21st, 1921. Diaper smells slightly of ammonia in the morning or after it has been on a long time. Rash better. February 24th, 1921. No smell of ammonia. Rash better.

It was exceedingly difficult to get intelligent co-operation from the mother of this infant and it was difficult to get perfectly clear and definite statements.

Case 5. D.H., male, age 2 years. Referred for ammoniacal diaper March 12th, 1921. Has been fed largely upon milk food and soup, with a very little bread or porridge. Complains of an ulcer of the meatus which crusts over so that he cannot pass urine. Condition present for 2 months. Mother has to make him pass water and has to bathe off the crust before he can do so. Has a slight ammoniacal rash over the lower anterior surface of the abdomen and has three ulcers upon the buttocks. The rash consists of small superficial ulcers with slightly indurated edges and with a parchment-like scale over the centre of the ulcer. This has been present for only a few days. The mother has noticed a strong smell of ammonia on the diapers for the last 13 months. Has been using the soap flakes already referred to for washing the diapers. We advised her to wash the diapers with a good laundry soap and to see that they were thoroughly rinsed.

March 14th. There has been no smell of ammonia from the diapers since the careful rinsing has been carried out. The ulcer of the meatus is healed. Rash is fading.

Twenty-four hour specimen of urine,340 c.c.

Ammonia from urea and ammonia using arcase method with Van Slyke & Cullen apparatus	3.4689 gms.
Ammonia	.20808 gms.

Ratio 1 : 16

March 17th, 1921. No return of ammoniacal odour, the rash or dysuria.

March 26th, 1921. There has been no return of symptoms.

Case 6. W.S., male, age 16 months. Referred for ammoniacal diaper. February 28th, 1921. Mother died when baby 9 days old. Being kept by foster mother. Fed on whole milk and water mixture until 5 months of age. He was always constipated and never thrived. Only weighed 6½ lbs. when three months old. He was brought to the Out Patient Department on August 12th and put on Lactic Acid Milk, the strength of which was gradually increased. Since being on this feeding has gained weight. The smell of ammonia has been noticed coming from the diaper on and off since August. It has become much more marked since the strength of the feedings has been increased and particularly since barley flour has been added, after which a rash appeared on the buttocks. The mother states that she has not been using any soap in washing the diapers. In order to investigate this case, it was admitted to hospital and kept upon exactly the same feeding as it had been having outside. No smell of ammonia could be detected from any of the diapers after admission to hospital.

Specimen of urine for 24 hours, 263 c.c., collected in bottle and surrounded with ice acid, many bacilli, only an occasional pus cell.

Ammonia from 5 c.c.	.0045 gms.
Ammonia from 24 hr. specimen	.2367 gms.
Ammonia from urea ammonia from salts from ½ c.c. urine	.007225 gms
Ammonia from urea ammonia from salts from 5 c.c. urine	.07225 gms.
Ammonia from urea ammonia from salts from 24 hr. specimen	3.80 gms.

Catheter specimen contained no bacilli

DISCUSSION

This last case was looked upon by the Out Patient Physician as strong evidence against the idea that alkali in the diaper was the cause of the ammoniacal odour; there was never any smell of ammonia from the diapers after his admission to hospital. The bacilli present in the specimen collected evidently did not greatly comtaminate the diaper or had not been there sufficiently long to free ammonia.

An incident occurring a few days ago is of interest. An attending physician reported an ammoniacal diaper on the ward and asked how this could be reconciled with the idea upon which we were working. The diaper which had been saved certainly had an ammoniacal odour but contained a loose, pale-gray, pasty stool, the organisms of the faeces were most probably responsible for the odour of ammonia. The condition did not recur although the diapers were carefully observed for some time.

It will be noted from the reports on these children with ammoniacal diapers that the excretion of ammonia as ammonium salts was not abnormally high and that the ammonia urea ratio was normal in all of the cases. Cases 2 and 4 illustrate particularly well the fact that as the feeding was increased in strength the symptoms became more marked. As was pointed out earlier more ammonia is excreted on a liberal diet than on a low one. None of these cases were on a high fat diet and Southworth's[3] contention that the ammoniacal diaper was due to fat in the diet has not been borne out by these investigations. Cases 4 and 5 are instructive in showing that one may meet with difficulty in getting mothers to take the necessary care and to persist in it long enough to get all alkali out of the diapers, or to see that they are cleansed of gross contaminations with excreted organisms.

CONCLUSIONS

In conclusion it seems clear that the ammoniacal diaper is due to external causes, of which the first and by far the most frequent is that an alkali is left in the diaper after washing. The second and a not altogether infrequent cause is contamination of the urine with organisms either from an infection of the genito-urinary tract or from some contamination from the outside. The free ammonia which gives rise to the odour comes largely from the breaking down of ammonium salts in the urine so that amongst the factors which will influence the condition will be a liberal diet. A child on a full diet excretes more ammonium as ammonium salts than does one on a limited diet and as has been seen, starvation treatment temporarily cures the condition. More or less correlated with this factor will be the age. In very young infants the condition is seldom met with, it is more marked in older children, who take more food. The acidity of the urine will play a part in that a urine which is near the neutral point will become alkaline and liberate ammonia much more readily, if either of the two external causes are present than will a highly acid urine. The administration of large doses of alkalies, however, will exert an influence by decreasing the excretion of ammonium salts. The concentration of the urine will also play a part, as a highly concentrated urine (one in which ammonium salts are also likely to be in greater concentration) will give off more free ammonia. However when it is recognized that the ammoniacal diaper is due to external factors, and is not indicative of any pathological condition in the child, and when it is further recognized that these external factors (the alkali of the diaper and contaminating bacteria) can be removed by thoroughly rinsing for the one and boiling for the other and the condition thereby entirely relieved then it will be evident from the standpoint of therapeutics that we need not consider all of the minor details which may influence the excretion of ammonia.

I desire to express my thanks for the very valuable suggestions from and help by Miss A. M. Courtney, Professor Harding and Dr. Alan Brown.

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TUBERCULOUS PERITONITIS

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WHILE the existence of chronic effusions in the peritoneal cavity was recognized centuries before the Christian era, it remained for Louis of Paris in 1825 to suggest first that the majority of the chronic forms of peritonitis were of a tuberculous nature. Spencer Wells in 1862 when operating upon a supposed case of ovarian cyst found to his surprise a large quantity of free fluid, and peritoneum covered with numerous warty growths. To his astonishment the woman recovered, and remained well. It was not, however, until 1884 that the condition was properly appreciated. In that year Koenig not only discriminated between tuberculous ascites and that due to other causes, but showed that tuberculous peritonitis with free fluid may be either general or localized, and that, without any other evident tuberculous focus in the body. Finally, he recommended that it be dealt with by surgical means.

There are three possible ways in which the peritoneum may be invaded by the tubercle bacillus; by the lymphatics; by the blood stream, or by direct extension from a contiguous focus. While it is obviously impossible in many cases to exclude the possibility of a blood infection, the lymphatic route is the source in the great majority of instances. In the first place there are undoubted cases of primary peritoneal tuberculosis. In 92 autopsies on patients dying of tuberculous peritonitis Cummings reports three in which no other lesion was found, while Borschke in 226 autopsies found the peritoneum to be alone involved in two: while Osler reports 5 cases as primary and 17 local in autopsies of his own. In 60 cases reported by Colman from the Children's Hospital, Great Ormond St., there were 9 in which the peritonitis was confined to the diaphragm and anterior wall, and in only 2 of these were there lesions in the mesenteric glands or intestinal mucosa, while in all there were caseous thoracic glands, and pulmonary tuberculosis. While again in 100 autopsies carefully conducted by Raw on children dying of tuberculosis, many of them ordinary cases of phthisis, 23 had caseating mesenteric lymph glands without any ulceration of the intestine. Obviously then, the tubercle bacillus can pass through the intestinal mucosa without leaving any trace behind, and set up an inflammatory process in the lymph glands or peritoneum, and experimental evidence proves this assumption to be true. Autopsy findings show the lungs to be involved in about 90% of cases, and the intestinal mucosa in percentages varying from 75 to 32, but these represent the terminal stage of the disease, and do not present a correct view of the situation as seen when the patient first comes under observation. And if about 3% are primary at autopsy, how much greater must the percentage be when abdominal distress causes the patient to seek medical advice.

When the disease spreads from a contiguous focus it is usually the Fallopian tubes which are held responsible, and Murphy maintained that in the female the majority of cases of tuberculous peritonitis were tubal in origin. It is extremely doubtful, however, if this is so, and indeed the evidence points to quite another conclusion. In the period from 1905 to 1920 there were 116 patients treated for tuberculous peritonitis in the surgical wards of the Toronto General Hospital. Of this number 79 were females, and 37 males. There were 98 operations, 68 being upon females, and 30 upon males. In only 11 instances were the tubes found enlarged at operation, or a little over 15%. There is evidence too that in many instances the tubal involvement is secondary to the peritoneal disease, for experiment has demonstrated a peritoneal current flowing in the direction of the Fallopian tubes. In this connection the observations of Barbour and Watson are interesting. In a study of tuberculosis of the Fallopian tube they found that the initial lesion was in the epithelial cells of the mucosa, and near the fimbriated extremity. In the earliest stage there was heaping up of the epithelium, and later destruction. The changes in the muscularis they considered to be secondary to the epithelial involvement. From this study they were of the opinion that the disease was not blood borne, but that the bacilli gained access through the surface epithelium. There is an analogy too in the occurrence of carcinoma of the ovary secondary to a growth in the breast, whereby the epithelial cells reaching the peritoneal cavity migrate to the pelvis, and become engrafted on an ovary.

Tuberculous peritonitis occurs in three forms: the ascitic, the adhesive, and the caseous, although it must be understood that in many cases there is no sharp line of division between them. The ascitic is the most common. In most cases the peritoneal cavity contains a considerable quantity of clear straw coloured fluid containing a variable number of lymphocytes and a few tubercle bacilli, but it may be greensih yellow in colour or blood-stained, and at times turbid or purulent. The quantity is variable, but is never so great as ascites from portal obstruction. The peritoneal surfaces are hyperæmic, and thickly studded with tubercles of varying size, the smaller ones grayish and translucent, while the larger, and older ones are caseous. On the intestine is frequently seen a fibrinous exudate, and at times the exudate contains numerous small flakes. If seen early there will probably be no adhesions found, but it is not uncommon to find a few present. In a later stage not only are the intestines adherent to one another, but also to other intra-abdominal structures. The omentum becomes converted into a hard dense mass lying transversely in the upper part of the abdomen, while the mesentery may so contract as to fix the intestines en bloc to the posterior abdominal wall. Portions of the peritoneal cavity may in this way be shut off, and localized collections of fluid, ascitic or purulent, result. The caseous variety is an exaggeration of the adhesive. Tuberculous areas of some size appear between the intestinal coils, or in connection with the mesenteric glands, caseation ensues, followed in many instances by secondary infection and abscess formation with fistulae between adjacent coils or upon the surface usually in the neighbourhood of the umbilicus. Very often the adhesive is a late stage of the ascitic, but it may develop subacutely without obvious fluid exudate. In this series 67 were ascitic, 47 adhesive, and 2 caseous, although in 8 of the adhesive there were caseous nodules.

Age is an important factor in the incidence of tuberculous peritonitis. It may be congenital and there is one case reported where a three days old baby was seized with vomiting, and died on the sixth day, and the autopsy showed advanced tuberculous peritonitis with intestinal obstruction. On the other hand Osler refers to a case in a man 82 years old. Out of 220 cases reported from the Massachusetts General Hospital, 178 occurred before the thirtieth year, and between 20 and 30 there were 89, which decade showed the largest number of cases. Osler's collection from the literature likewise showed the largest number occurring in the third decade. In the present series there were between the ages 10 and 20 thirty-three cases; between 20 and 30 forty; between 30 and 40 twenty-five; between 40 and 50 twelve; between 50 and 60 five, and between 60 and 70 one. Here, too, the third decade accounts for the largest number. The youngest was eleven years of age, and the oldest sixty-four. Eighty-four per cent. of the cases occurred between the tenth and fortieth year. At the Massachusetts' General Hospital as high as 80% of the cases occurred before the thirtieth year, but when the 49 cases in children under ten are deducted the proportions are very similar. Jacobson, after reviewing the statistics of various countries concludes that the disease occurs most frequently between the twentieth and fortieth years. There is one striking series of cases at variance with these conclusions, however, for in 164 personal cases reported by Nothnagel 60% were over thirty years of age and the fourth decade supplied the greatest number.

The relation of sex to tuberculous peritonitis is interesting. In Osler's series 70% were males, but in his collected statistics there were twice as many females as males. W. J. Mayo found it four times more frequent in the female. Shattuck in 98 cases found 67 to be men and 31 women. Stone in 122 cases had 62 males and 60 females. In Nothnagel's series just referred to there were 101 men and 63 women. In this series as already noted there were 79 women, 37 men, or roughly a proportion of two to one, which agrees with Osler's collected statistics.

But if the records from the postmortem room are taken a very different conclusion is arrived at. Bircher collected 452 autopsy records of individuals dying of tuberculous peritonitis; 74% were males and 26% females. Taking the average of three other series the ratio of three males to one female at the autopsy seems to be fairly accurate. Had autopsies been performed on all those who died in this series the proportion would have been two and a half to one. On the other hand the death statistics from England show approximately the same percentage in the sexes namely 0.16%.

A history of tuberculosis in the family is of great importance. A positive finding is present in from 20 to 40% of the cases. In this series there was a positive hereditary history in 24%. Previous illnesses frequently have an important bearing, especially pleurisy, which was present in 14 or 12 per cent. in this series. In only one instance, however, was the operative finding suggestive of the tuberculous process in the peritoneum having spread from the pleura. In one instance it started as an ischiorectal abcess with fistula eight weeks previously, in another there was an old tuberculous hip, with considerable shortening, and a third had a tuberculous spine. Occasionally traumatism appears to have a direct aetiological bearing. One woman age 50 in this series was knocked down by a bicycle and symptoms developed rapidly from that date, and death occurred in six weeks. Jacobsom of Syracuse reports a similar case. Where traumatism is a factor the case is likely to be an acute one. Childbirth is given as an aetiological factor by some writers. It was noted in only two cases in this series.

The symptoms manifested by tuberculous peritonitis are of extreme diversity. In the first place it may be latent and not cause a single symptom, being discovered accidentally in an operation for hernia, or it may be so sudden as to come under the category of an acute abdominal disease. Most writers agree in considering the majority of cases as gradual in onset. Jacobson, however, quotes with approval the statement of Lauper of Kocher's clinic, that all cases of tuberculous peritonitis have a prodromal period of several months, and at the conclusion of this period nearly all have a sudden outbreak of acute manifestations. During this prodormal stage the patients suffer from gradual loss of appetite, languor, malaise, and vague abdominal complaints with irregular action of the bowels. In this series 84% had prodromal symptoms, and of these 20% after a shorter or longer period had an acute attack. In 16% the onset was sudden without any previous period of ill-health. In one instance the attack came on after a game of ball, the boy having sat down on the damp grass at the end of the game. In another instance the acute attack seemed to have been precipitated by a lobster luncheon, while in another a man was taken suddenly ill on the street with pain and vomiting after having paid a visit to a sick friend.

The most common symptom is pain in some portion of the abdomen, the character depending upon whether the condition is acute or chronic. Frequently the pain radiates to the back, and in a few instances down the thigh. When localized it is more frequent in the lower than in the upper abdomen. It was present in over ninety per cent. of the cases. As a rule tenderness is present, and it may be general or local.

The behaviour of the temperature is a valuable sign, and in 14 instances in this series there was no rise above normal, while in a few it was markedly subnormal. In one of the fatal cases the temperature was subnormal throughout. In the severe cases it is unusually high. Secondary infection of caseous areas will cause the patient to run a high fever.

While the majority of the patients have lost weight, some are well nourished, and in two instances the women are described as fat. Disturbances in urination are frequent. In some there is frequency, while in others there is pain. Jacobson says that these symptoms are present in about one half the cases, but they were noted in but 12 instances in this series, and in three of these the disturbance lasted but a few days, one having had difficulty in starting the stream. Vomiting was a prominent symptom in 22 cases. Marked constipation in 5, and diarrhoea in 10. In only three was there microscopic evidence of blood in the stools. A few had alternating constipation and diarrhoea. Loss of weight was a pronounced symptom in 29 cases. Four complained bitterly of headache, and one of nosebleed. Night sweats were severe in 7 instances, and one of nosebleed. Night sweats were severe in 7 instances, and chills in 6. Dyspnoea was troublesome in but 5 instances. Menstrual disturbances are noted in 11 cases.

The leucocytes varied from 3,400 to 19,800. In 60% the count was 10,000 or less. Stone from his series concluded that a high leucocyte count associated with tuberculous peritonitis indicates the presence of sepsis in some form, and that in non septic cases the tuberculous process is attended with a low count. There is doubtless a great deal of truth in this statement, but on the other hand it must not be assumed that because there is a normal count the patient is in no particular danger, for in 4 of the fatal cases the count was less than 9,000 in each of them.

The most common local manifestation is an increase in the size of the abdomen. Usually ascites is the cause for this condition but it may be due to gaseous distention and in the adhesive variety tympanites is the usual cause. Tumour formation may be due to several local changes. The commonest is that due to a deformed omentum which becomes puckered and rolled into an firm elongated mass usually lying transversely in the upper part of the abdomen. It was noted in 16 instances in this series. Rarely a local tumour is due to coils of intestine firmly matted together and of this there was one example in the series. Sacculated collections of fluid caused by adhesions either between several coils themselves or with the mesentery or abdominal wall as one of the boundaries account for a small precentage of local swellings. There were three in the series, one in the upper abdomen, one in the pelvis, and one below the umbilicus. Enlarged mesenteric glands with secondary changes are occasionally responsible for tumour; especially in children is this the case.

When the distension is considerable the skin will be found thin and shiny. In one case it was pigmented. In three instances there was considerable swelling of the lower extremities.

The diagnosis of tuberculous peritonitis is not always easy, and may be extremely difficult. Both the family and previous history should be gone into most carefully. The lungs must be examined for old or active lesions, and stereoscopic plates made. In the female patients a careful pelvic examination should be made, and any abnormality of the tubes noted. Where the fluid is free in the peritoneal cavity the condition must be diagnosed from other causes of ascites. These are—(1) General, as in cardiac or renal disease, but in such conditions the ascites is part of the general dropsy and should give rise to no difficulty in diagnosis even where the tuberculous peritonitis is complicated by oedema of the legs as occasionally happens; or (2) Local and in this connection one must rule out particularly ovarian cyst. This is in many instances difficult even without encapsulation as is attested by the many operations for supposed cysts. The Ascites due to portal cirrhosis or to pressure from any cause upon the portal vein must be differentiated from as must also be malignant peritonitis and Banti's disease in the late stage. Cirrhosis should be ruled out without much difficulty, but it should be borne in mind that tuberculous peritonitis is a frequent complication in a terminal cirrhosis. Cases with a rolled up omentum are hard to differentiate from a similar condition in carcinoma. Even with the abdomen opened it is impossible at times to tell whether one is dealing with a tuberculous peritonitis or with a malignancy, so that reliance must be placed upon the histological picture. Cases with gradual onset, a low type of fever and tympanites with vague abdominal pains are apt to be mistaken for typhoid, but a blood test and culture should readily differentiate between them.

The complications of tuberculous peritonitis are chiefly fistulous formations, and acute or chronic obstruction and jaundice. The fistulae may form between adjacent coils of intestine or into the vagina or on the surface of the abdomen when they most frequently appear in the neighborhood of the umbilicus. They result from secondary infection of caseous masses, and are invariably of very serious import. How frequent are the internal fistulae is obviously difficult and in many instances impossible to determine, for even at the necropsy it is hard to be certain whether or not the hole in the bowel was produced by separating adhesions. In this series there were two instances of external fistulae, and both died in hospital. One patient was operated on for acute obstruction which was caused by a band, while in two instances there was chronic obstruction. In one of the latter the sigmoid was so compressed that the barium enema failed to pass, and at the operation the diagnosis of malignant disease was made, and a piece of tissue removed for section. The patient had only been ill for two weeks. There was no instance of jaundice in the series, but on account of its rarity, I may be pardoned for taking this opportunity of reporting a case I had in the army.

Mr. G., age 27. Reported sick May 2nd, 1917, complaining of pains in the right shoulder and stomach, nausea, with weakness and diarrhoea. About three weeks later jaundice appeared, but without any severe pain. He had typhoid three years previously, and was in bed eight to ten weeks. Examination on May 24th showed the patient well nourished, but deeply jaundiced. There was slight elevation of temperature, and no acceleration of pulse. The liver was two fingers' breadth below the costal margin, and there was no evidence of fluid in the abdomen. On August 1st I saw him again. The jaundice at this time was intense. He had lost a little weight, but was still well nourished. The liver was down a hand's breadth with a thick hard edge. A large mass six inches long and an inch and a half in diameter lay in the location of the descending colon. Other masses were apparent two inches to the right and below the umbilicus. Rectal examination was negative, as were the Wassermann and tuberculin tests. Lactic acid was present in the stomach. Clinically the chest was negative. On August 7th the abdomen was explored through a right rectus incision above the umbilicus. Adhesions were everywhere present, but no fluid. The stomach was fixed to the under surface of the liver in a hard dense mass. The gall-bladder was likewise embedded in a hard mass, and discernible with the greatest difficulty. The bile ducts could not be examined, so dense were the tissues about. Masses were felt in various parts of the abdomen. There were some yellowish nodules about the size of beans on the parietal peritoneum, with a distinct bile stain, but nothing on the visceral layer in the vicinity of the wound. One of these nodules felt calcareous. The liver was very firm and fibrous, but presented no nodules. A diagnosis of malignancy was made. The man died 48 hours later. On opening the abdomen there was considerable haemorrhage in the peritoneal cavity. The stomach was found to be inextricably bound to the liver, and the bile ducts could not be dissected out without a great deal of tearing. There was a hard yellowish mass to the right side of the gall-bladder, which latter although embedded, did not appear to be much thickened. The common bile duct was normal in size.

The pancreas was considerably enlarged and very firm. The pylorous was fully three inches to the right of its usual position, and the duodenum densely bound down. The large mass in the left side was the omentum, in the midst of which was a large caseous mass. There were large masses behind the umbilicus. On the sigmoid were some typical gray tubercles. As only a limited autopsy was permitted, no other cavity was examined. Histological study demonstrated the condition to be tuberculous peritonitis.

The prognosis in tuberculous peritonitis depends upon several conditions. If there is elsewhere an evident focus in an active condition the outlook is worse. Rapid wasting is obviously of serious import, and the presence of diarrhoea means ulceration of the intestinal mucosa and a bad prognosis. Persistent high fever is a bad sign, but a subnormal temperature is frequently seen in cases that are going rapidly down hill. Faecal fistula, whether spontaneous or the result of breaking down of adhesions is nearly always fatal. The prognosis is best in the ascitic form, and worst in the adhesive complicated by one or more purulent foci.

The surgical treatment of tuberculous peritonitis dates from the time when Spencer Wells opened the abdomen for a supposed ovarian cyst, and his patient after a stormy convalescence recovered and remained well. König as early as 1890 reported 131 cases, 14 being his own, with recovery in 84, or approximately 64%, and gave a great impetus to the operative treatment. Since that time there have been numerous operative procedures adopted, but for the most part they have been discarded in favour of a simple laparotomy with a search when possible for any intra-abdominal focus, and its removal where such is feasible. Although the theories advanced are numerous enough, how opening the abdomen and allowing the fluid to escape cures the condition is not known, and I shall not take time to discuss them. Neither shall I say anything about the medical treatment further than that it should always be tried for six weeks; then if no improvement ensues operation should be performed, provided the condition is of the ascitic variety or again operation is indicated in the adhesive type if there is evidence of a local focus as for example a tubal mass or where there is an abscess in an accessible position.

About the year 1905, owing to the large number of recurrences after operation the question was extensively discussed as to whether medical or surgical treatment gave the best results. Numerous statistics were quoted on each side. Of 21 cases which Ochsner was able to follow 15 were well from 1–11 years after operation and 5 had died; of Rorsch's collected series of 358 cases the immediate recovery was in 253 or 71%. The operative mortality was 5.6% and there were 14.8% cures after 2-3 years. Against this, however, the combined statistics of Borchgrevink and Sutherland show 82% of cures by medical means as against 58% when a laparotomy was done. Munro gives 30-40% cures after 1-2 years in cases that had resisted medical treatment. Fenger quotes the operative mortality as 1-2%. Hall reports 94 immediate cures in 110 operative cases or 85%. Thomas gives 73%, while Walter says 50% of ascitic cases are cured by opening the abdomen. Shattuck found that the ultimate result in cases treated surgically was a mortality of 37.5%, while the medical death rate was 68%, but admits that in the medical series other tuberculous foci co-existed.

W. J. Mayo is a strong advocate of more radical measures in treatment. He found some of his cases coming back as many as four or five times, and these were cured after removal of the tubes. In 26 instances he found the peritonitis greatest near the tubes. Carstens of Detroit has recently emphasized the desirability of leaving the tubes alone unless definitely diseased, as the outcome is quite as favourable as after removal. Certainly if there are extensive adhesions, no attempt should be made to break them down to remove a doubtful focus, as more harm than good will likely result. Faecal fistulae are very easily produced, as for example the recorded case of König's due to merely rubbing iodoform into an infected area. Re-accumulation of the ascites is not a contra-indication to another operation, and many cases recover after repeated laparotomies.

In this series there were 98 operations, 68 of which were on women, and 30 on men. There were 14 deaths, 10 of which were males, and 4 females. Only in 5 instances did death occur sufficiently soon after operation to be attributed to it, making an operative mortality of 5.1%. The youngest was a boy of 16, and the oldest a man of 48. The average age was 38. In 11 instances the tubes were considered pathological, while in 12 cases the appendix was removed. In only two of the appendices, however, was there enough acute inflammation and enlargement to make the operator think they might be the primary focus. In 14 instances the operation wound became infected with tubercle and a sinus persisted for various periods and in some the patient had a second and third operation for its cure, but without any benefit.

In endeavouring to find out whether or not a patient was improved after an operation I have been guided to a great extent by the temperature and pulse rate, and whether or not there was less pain and discomfort or whether the fluid began to return, rather than the statement of the houseman who wrote the notes, for in several instances where improvement was noted, I could not satisfy myself that such was the case. Out of the 98 operative cases then, improvement on leaving the hospital was present in 40, or about 40%. Adding 6 doubtful cases that were operated upon to the 4 non operated improved cases, we find that 50 out of the 116 in the series may be regarded as immediate cures, or a percentage of 44.6. What percentage were permanent cures is not known.

A METHOD OF PREVENTING THE ABSORPTION OF INTESTINAL TOXINS

"Keep the colon toxins from being absorbed by the body," is the urgent appeal of the modern authority. This is almost tantamount to saying: "Keep the mucous membrane of the colon intact," for it is through abrasions in this membrane, hindering the outflow of mucous into the colon, that the absorption of toxins from the fecal matter takes place.

To overcome such a condition, Nujol is freely used by the profession. It retards the absorption of poisons by preventing their contact with the living tissues. It also exerts a lubricating power, softening the stools to permit easy and frequent evacuation. In addition to this, an important function of Nujol is the absorption of toxins, retaining them in the fecal mass until expelled.

Nujol is readily accepted by the most "finicky" patient, because it is absolutely tasteless, odorless and of a crystal clearness.

INTESTINAL TUBERCULOUS INFECTION IN CHILDREN

H. H. Pitts

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THE paths of tuberculous infection and invasion are still in dispute and in the majority of cases of advanced, generalized tuberculosis almost impossible to determine. Recently the possibility of primary tuberculous intestinal infection has, especially in children, been gaining ground and it is now held with some justification that even pulmonary, or the so-called aerogenous or inhalation type may be traced to an original gut invasion.

The two cases which are herewith reported have an especial interest in this connection. They are both examples of generalized tuberculosis—one a miliary tuberculosis, the other a tuberculous meningitis—in which only a limited strictly localized, more or less quiescent, tuberculosis of the gut, in an unusual situation, appeared as primary lesion. Remarkable is further that no tuberculosis existed anatomically elsewhere, with the exception of the mesenteric glands, which were, it appears, infected from the gut. Important was the entire lack of tuberculous foci in lungs or even in the peri-bronchial glands. The small intestinal lesions, which in a cursory examination could have been easily overlooked, had led to a considerable involvement of the mesenteric glands alone from which generalization then occurred:

Case 1. Female, age 11 years, admitted December 3rd, 1920, unconscious. Sudden onset 3 days previous, characterized by anorexia, weakness, constipation and slight "cold." She vomited during the first three days of illness. Headache slight but generalized since November 30th. Irritability and insomnia.

December 1st. Irrational. December 2nd. Hemiplegia and ptosis left eyelid.

St. Pr. Patient unconscious, right hemiplegia; pupils widely dilated, head turned to right; neck stiff. Vocal fremitus increased over whole chest. Percussion note slightly impaired in right upper lobe. Numerous moist rales. W.B.C. 10,000. Spinal fluid under pressure. Globulin +++ .40 lymphocytes per cmm Patient died December 3rd.

Autopsy, 175-20, revealed a fairly generalized recent miliary tuberculosis and tuberculous meningitis. The lungs showed no evidence whatever of any old tuberculous focus from which miliary infection could have occurred, but only recent miliary tubercles. Moreover the bronchial and peribronchial lymph glands were quite free from any evidences of tuberculosis.

In the lower part of the jejunum, in an area covered by only a few inches, along the mesenteric attachment are found, firmly embedded, a number of strictly limited, large pin-head sized, firm tubercles in and below the mucosa and in the mesentery. Those in the mucosa have not led to any ulceration and the mucous membrane itself appears intact above the tubercles. The rest of the gut is clear and clean throughout.

The mesenteric, perigastric and pancreatic lymph glands were enlarged and showed small yellowish tuberculous nodules.

Microscopic sections from an involved portion of the jejunum show throughout intact and well preserved mucosa with healthy glands. In one area of mucosa a minute tubercle, made up of necrotic but not cheesy epithelioid cells is to be seen, surrounded by lymphoid cells, immediately below intact glandular acini. It appears strictly limited, not spreading and is apparently quiescent. In the submucosa and extending to the muscularis a large cheesy but also well circumscribed tubercle may be seen. Extensions are not visible and the surrounding parts of the gut appear quite healthy.

Sections through the mesenteric lymph glands show typical tuberculous lesions.

Case 2. Male, age 2 years. Admitted November 8th, 1920, semi-conscious.

Course.—Became very irritable since October 18th. Some fever and headache. Profound constipation and malaise, listlessness. Vomiting. Internal strabismus, stiffness of neck, stiff, restless movements of extremities. Clinical diagnosis: Tuberculous Meningitis. Died November 10th, 1920.

Autopsy, 168-20, revealed a thick gelatinous exudate over base of brain and many small pinpoint tubercules following the branches of the middle cerebral arteries. Increase of fluid in lateral ventricles.

In the lower part of the jejunum a small superficial ulcer, 3 x 2 mms., may be noted at the mesenteric border, at one end of which is a tubercle the size of a large pinhead. The mesenteric glands vary in size from a pea to a large marble and many are caseous, but there are no evidences of tuberculosis elsewhere. Microscopic sections through the meninges showed typical tubercules. Microscopic sections through the involved portion of the gut show a number of typical, partly cheesy, larger tubercles with a tendency towards confluence. These occupy the whole of the submucosa and extend to the muscularis. Stretches of mucous membrane above these tubercles have collapsed and are partly necrotic, although glandular acini and their supporting structures are still visible. In neighbouring parts ulceration is further advanced and leads to necrotic loss and granulomatous inflammation of mucosa and submucosa.

The lungs, peri-bronchial, and bronchial lymph glands as well as other organs were uninvolved and showed no tuberculous lesions.

These two cases point clearly to an intestinal path of infection and are also remarkable in the finding that the mesenteric glands were the only group of glands which were visibly affected. This is so much more noteworthy when it is realized that tuberculosis of bronchial glands is the most common type of early and quiescent tuberculosis in infants and in children.

Both cases conform with the common experience that the most frequent generalizations of tuberculosis in infants and children are miliary tuberculosis and tuberculous meningitis, and that pulmonary tuberculosis does not become manifest until after the *tenth* year. (Hamburger, Tuberkulose d. Kindersalters, 1912.)

Of interest and importance also is the situation of the tubercles in the gut. The invasion and primary lesion in these cases did not occur where they are most generally expected and where the gut is richest in lymphoid tissue, i.e., lower part of ileum, but both were in the lower part of the jejunum and of very limited and circumscribed character. It is also interesting to note that in the first case epithelial and glandular lining of the gut were intact, making it appear that bacilli passed into the mucosa without superficial injury.

These two cases lend, therefore, in their clear cut character an almost experimental evidence that, at least in children, the higher portions of the gut may be the port of entrance for tubercle bacilli and that the original focus may be a strictly localized tuberculous lesion in this situation. From this point, however, secondary extension to, and greater involvement of mesenteric glands may occur with final generalization and anchorage in those organs which, by virtue of predisposition of age period, are particularly liable to tuberculous disease.

The cases also emphasize the care with which the gut must be inspected even in unsuspected places before the presence of tuberculosis of the intestines is definitely excluded. In this connection it may be of interest to record that in a case recently observed in these laboratories, in which the appendix had been removed by operation from an adult male, 30 years of age, for what clinically and anatomically appeared to be a non-specific exudative and productive appendicitis and peri-appendicitis with a peri-appendicular abcess, small, localized, apparently quiescent tubercles, composed of epithelioid and giant cells without caseation or any tissue reaction around them, were later discovered in otherwise well-preserved lymphoid follicles of certain parts of mucosa and submucosa. The acinar elements and lining of the mucous membrane continued here also intact over them. Nothing in the patient's history had pointed to tuberculosis anywhere. Recovery was uneventful and the patient was discharged cured 12 days after operation.

A CASE OF WOODY THYROIDITIS

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THE patient was a married woman 38 years of age. She had a family and had never suffered from any illness which could be connected with her present trouble. No family history of tuberculosis could be obtained.

Last August, at the end of her menstrual period, a swelling appeared in the right thyroid lobe which was very painful, tender, hard and fixed. So painful indeed was it that the patient said it felt like a boil. About a week later the left lobe became similarly involved. By this time she was very ill and suffered from severe headaches, chills, night sweats and loss of appetite. A physician was called and he diagnosed her condition as an acute toxic goitre. Her pulse was 160 per minute. She was ordered to bed for absolute rest. Three weeks later Dr. Onhauser saw her. Her condition was still worse. Her temperature ranged from 100 to 103 and her pulse went up to 170 at times. None of the classical eye symptoms of Grave's disease were present but there were very fine digital tremors. The tumour was bilateral, each lobe being about the size of a hen's egg, very hard and easily defined. She was now taken into the hospital. After a week of absolute rest she felt better. Her pulse was 100 to 140 and her temperature had dropped to normal. A diagnosis of carcinoma of the thyroid was made on account of the extreme hardness of the mass. Dr. Brandson operated on her, removing both lobes and leaving a small mass of what appeared to be normal thyroid tissue at one lower pole.

Her recovery was uneventful and after 8 days she left the hospital. Two months later her pulse had fallen to 72, her temperature was normal and she felt well. The scar was barely noticeable. She had gained 20 pounds, felt in good health and was able to do her own housework.

PATHOLOGY.

Gross Appearance.—The mass of thyroid tissue which was removed was quite unlike any thyroid I have ever seen. Each lobe was about the size of a small hen's egg, of regular outline, oval and slightly flattened. It had an opaque, dead white colour, and the term "Woody" or "Iron-Hard" very well described its characteristic hardness which at first sight led us to believe that it had been preserved in pure formalin. Scattered over the cut surface were numerous small cysts separated by dense strands of connective tissue with here and there patches of a yellowish colour.

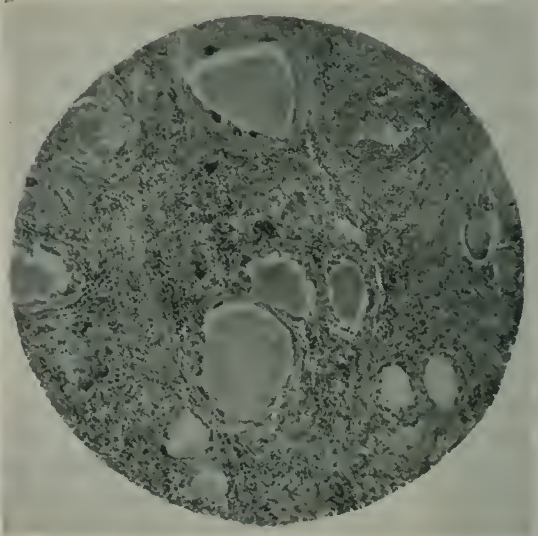

Fig. 1. Frozen section, thaematoxylin and sosin stain. X 100 Diameters. Section shows open spaces partly filled with colloid material. The connective tissue proliferation is very marked. Several giant cells and areas of round cell infiltration are seen.

Microscopic Appearance.—A microscopic section showed no resemblance to ordinary thyroid. Only a few colloid spaces remained, the others being choked out by the overgrowth of capsular and interstitial connective tissue. There were no areas of caseation but here and there masses of round cells were seen and the nearby fibroblasts had plumper nuclei with less cytoplasm. Definite typical giant cells were seen at intervals throughout the section. From this pathological examination the condition seemed to be of longer standing than the symptoms would suggest. The extreme hardness of the thyroid mass, the very marked fibrosis and the presence of occasional giant cells led to a diagnosis of "Woody" or "Iron-Hard" Thyroiditis described by the German writers. *See Fig. 1.*

Woody thyroiditis is generally though not always of tuberculous origin. In acute miliary tuberculosis the thyroid is often involved, but this is of no surgical interest, as the thyroid involvement is but a part of a very widely disseminated fatal infection. Tuberculosis may attack the thyroid acutely, thus causing the patient to suffer from acute thyrotoxic symptoms, or the tuberculous process may be of a chronic character and produce as a result this condition of woody thyroiditis. Plummer and Broders[1] of the Mayo Clinic report seven cases of tuberculosis of the thyroid which they divide into three groups. First group, two cases, showed a very marked hyperthyroidism; with early tuberculous changes found on pathological examination. Second group, one case, showed a less pronounced hyperthyroidism and a slight fibrosis of the thyroid. Third group, four cases showed little or no hyperthyroidism and a very marked tuberculous fibrosis. M. Couloud[2] described 120 cases of tuberculosis of the thyroid in which 86 showed fibrosis varying from moderate to very marked. The third group described by Plummer and Broders and the 86 by Couloud would correspond to woody thyroiditis. There are pathological conditions of similar harness to this condition in other glandular organs but of non-tuberculous origin. Such are the Riedel pancreas, the Mikulicz submaxillary fibrosis, the Küttner lachrymal gland.

Woody thyroiditis is generally confounded with carcinoma. It is very important to differentiate them because while in carcinoma the prognosis is bad, it is extremely good in woody thyroiditis. They have many points in common. Both are hard, rapidly growing tumours, but other features help to differentiate them. Carcinoma generally occurs in females, woody thyroiditis more frequently in males. In carcinoma the growth is very nodular and large, in woody thyroiditis it is of medium size and smooth. Carcinoma occurs more frequently in those who have previously had a goitre, especially if they have had an operation, while woody thyroiditis occurs often in patients affected with pulmonary tuberculosis.

In conclusion, when a physician is consulted by a young or middle aged patient with a hard, smooth, painful swelling of the thyroid with or without thyrotoxic symptoms, I would suggest that woody thyroiditis be considered in the differential diagnosis.

I wish to express my indebtedness to Dr. Onhauser of Minnedosa for the history of this case, and to Dr. Brandson for the pathological specimen.

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[1] PLUMMER and BRODERS, "Tuberculosis of the Thyroid", *Minnesota Medicine*, May, 1920.

[2] M. COULOUD. "Le corps thyroide des tuberculeux." *Bull. et Mém. de la Soc., Méd. des Hôp. de Paris.* Dec. 23, 1920.

COMMENTS ON BROMURAL

The sedative action of bromine, while unquestioned, is seriously militated against by certain collateral effects when given in the form of its inorganic alkaline salts, the bromides. They do not carry the halogen well. Such derivatives as Bromural are advisedly to be used in their stead, affording as they do the straight hypnotic and sedative effects wanted.

Bromural is one of the best of these organic bromine compounds and appears to be very satisfactory in cases of nervous insomnia and general nervousness. It is said to produce sleep without markedly affecting the circulation or respiration. In nervous and hysteric cases, especially affecting women, it brings calm and rest. But like other hypnotics it may fail where there is pain or cough; these symptoms must be subdued by other measures or adjuncts. The dose is five to ten grains. The advantage is claimed for it that, while quickly and decisively impressing the central nervous system, it does not stupify to the degree that other agents of this class are wont to do, nor leave that feeling of heaviness which after some hypnotics is quite distressing.—*Am. Journal Clinical Medicine,* May, 1921.

BLOOD TRANSFUSION IN SEVERE BURNS IN INFANTS AND YOUNG CHILDREN

A Preliminary Report of the Treatment of the Toxic Shock by Blood Transfusion—with or without preceding exsanguination.†

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A review of a hundred consecutive cases of burns and scalds admitted to the wards of the Hospital for Sick Children within the first 24 hours of injury, shows that the greatest number (74%) of severe burns is encountered in children of 4 years and under. An analysis of these cases reveals a startling mortality, not so much from the primary shock, but from the secondary toxic shock, and particularly in those cases of 2 years and under.

		0–2 yrs.	2-4 yrs.	4-8 yrs.	8–12 yrs.
Recovered...........		16	31	11	7
*Died	Primary shock	5	3	4	1
	Toxic shock ..	8	8	2	1
		29	42	17	9

TOTAL 100 cases.

Only the cases of burns and scalds severe enough to demand hospital treatment are considered. The slighter cases treated in the out-patient department are not discussed.

The main problems encountered early in severe burns in infants and young children are (a) primary shock, (b) toxic shock.

Primary Shock:—Where the primary shock is so intense that death may occur a few hours after the injury, treatment directed towards relief of the shock is very disappointing and the burn is usually so severe and extensive as to preclude the possibility of recovery either in the immediate or remote future.

Toxic Shock:—In a certain number of cases, the primary shock merges indefinably into the toxic shock, so that no stage of recovery from the former is apparent. This condition renders the success of any form of treatment very doubtful.

There is, however, a type of case in which the primary shock is mild or absent and the burned area though fairly extensive, not deep, but in which fatal result is the rule. Unfortunately, we are all too familiar with the case of the burned child, in which at first the general condition is good, brought in an hour or so after injury showing *e.g.* a fairly extensive 2nd and 3rd degree burn† of trunk or extremities. On admission, the general condition seems to be better than the extent of the burn might warrant, but in the course of 24 hours or so, the temperature rises, and a convulsion occurs. Cases of this type usually die in 36-60 hours after one or more convulsions, with temperature often as high as 107°. (See Fig. 1.) In older children one may see only cyanosis of the extremities and the signs of circulatory collapse before death.

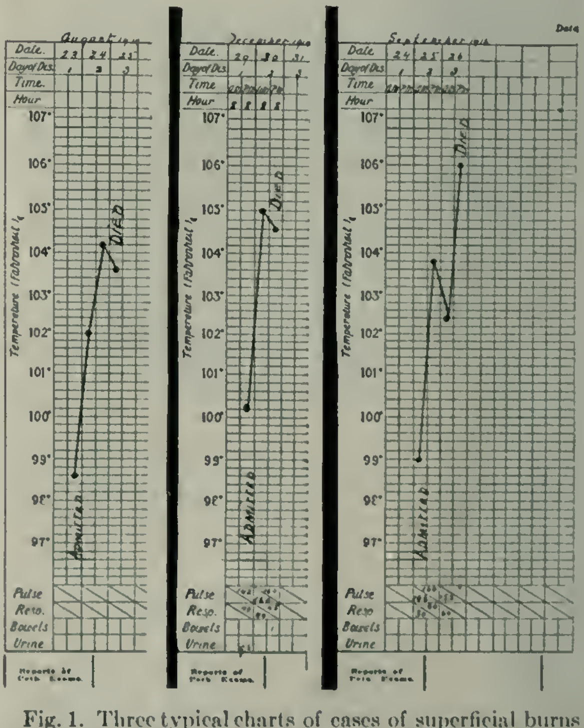

Fig. 1. Three typical charts of cases of superficial burns dying of toxic shock and not treated by transfusion.

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*Three other cases between 2-4 years died of bronchopneumonia, infection of burned area, and intestinal haemorrhage, respectively.

†Cases 1-6 reported before combined sections of Surgery and Pathology Academy of Medicine, Toronto, March 15th, 1921.

In a recent investigation of the pathology in 10 cases of superficial burns, Weiskotten[1] (see reference) found characteristic lesions in suprarenals, lymphatic tissues and heart muscle "indicating the presence in this class of cases of a more or less specific poison in the circulating blood." These changes commenced a few hours after the injury was sustained and were progressive for not more than three days. In the lymph nodes, at least, retrogression of the lesions began at the end of three days.

It would appear probable then, that there is a toxin produced in the burned tissue and that it is thrown into the blood stream,—that its action diminishes after about three days, either through diminished production, or as a result of the resistance of the body tissues (neutralization or elimination), and it is a significant fact that those cases noted in our statistics as dying of toxic shock practically all succumbed within 60 hours of the receipt of the burn. Clinically, it would seem that the toxin is gradually liberated from the damaged tissue and taken up by the blood, until, in the fatal cases, a cumulative effect is produced on the central nervous system: the temperature rises, and convulsions are precipitated. In the non-fatal cases the absorption of toxin is indicated by a rise in temperature and drowsiness: there are no convulsions, and the toxin is eventually neutralized or eliminated.

It is in the period of toxic shock, before the nervous system has been overwhelmed by the toxin, that treatment directed towards the neutralization or elimination of toxin should be established. Various procedures have been tried, such as the intravenous and subcutaneous administration of saline and of glucose solutions, with the idea of diluting the toxin, and of hastening its elimination, but in the more severe cases, these measures have fallen short of the objective point.

In the hope of overcoming the effects of a circulating toxin, the treatment by blood-transfusion, or the more radical procedure of "exsanguination-transfusion" was carried out in this Hospital. The seven following cases serve as a basis for this report. It will be noted that pneumonia—a not infrequent complication of burns—occurred in two of the cases. In one, which recovered, it followed a chest-wall burn, and in the other it was caused apparently by inhalation of fumes, and resulted fatally.

The technique of "exsanguination-transfusion" is briefly as follows:—

After preparation for the transfusion, blood is withdrawn from the patient until there are beginning signs of blood loss. Where the anterior fontanelle is open, blood may be withdrawn from the longitudinal sinus. In older children, we have used the external jugular, the femoral vein (a cannula being introduced through the proximal part of the saphenous vein) or the radial artery. (It is impossible to obtain any considerable quantity of blood from the superficial veins of the extremities in a child under 5 years of age, particularly if the circulation is sluggish.) The transfusion is then commenced, the donor's blood being introduced by the great saphenous vein over the internal malleolus, while further exsanguination is being carried out carefully. In an infant, it is obvious that only a small amount of blood (up to 120 c. cm.) can be withdrawn before the transfusion must be started, so that after the commencement of the transfusion, the blood withdrawn from the patient must contain an increasingly large percentage of the transfused blood. Notwithstanding this, it is apparent that a considerable amount of the patient's own blood is withdrawn during the procedure, and it would seem to have been in such quantity that enough of the toxin was removed to turn the scales in favor of the patient.

The transfusion is carried out preferably with citrated blood in 100 c. cm. glass syringes, as by this method, a larger supply is more immediately available. It is a wise precaution to have adrenalin at hand for an intravenous injection should any signs of collapse occur during the exsanguination. If, during exsanguination, the margin of safety has been too closely approached and the pulse becomes imperceptible, the transfusion should be begun immediately and m $\bar{\underline{v}}$ to m $\bar{\underline{x}}$ of adrenalin 1-1000 given intravenously. This latter is best done by introducing the hypodermic needle into the rubber tube connecting the citrate syringe with the cannula in the vein. The immediate effect of the adrenalin is to produce a sudden blanching of the face, followed by a few dry coughs—the pulse improves almost immediately.

Case 1. G. S., male, age 3 years. Admitted on the afternoon of Dec. 6th, 1919. Forty-five minutes prior to admission, the child upset a

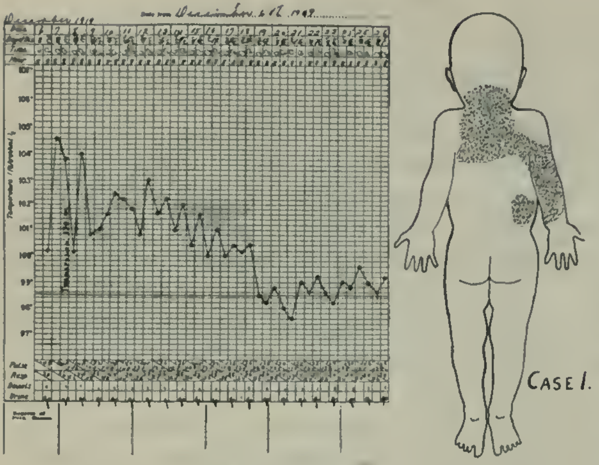

Fig. 2. (Case 1.)

bucket of hot water over himself and remained lying in the hot water for two minutes.

On admission, the general condition was fairly good. There was a 2nd and 3rd degree burn over the back of the neck, both scapular regions, right lumbar region, and right arm down to wrist. T. 98. Pulse 140. Resp. 44. Picric acid dressing applied.

Dec. 7th. 4 a.m. Temp. 101.6

8 a.m. Temp. 104.6. Pulse 160. Patient has had two convulsions and is very toxic. Blood transfusion of 190 c.cm. from father (both in group 4) and in addition 50 c.cm. normal saline.

Dec. 8th. One more convulsion at midnight. General clonic contractions over body. Subcutaneous injection of 200 c.cm. saline and of MgSO4 (8% solution 20 c.cm.) Further progress uneventful apart from development of chicken pox.

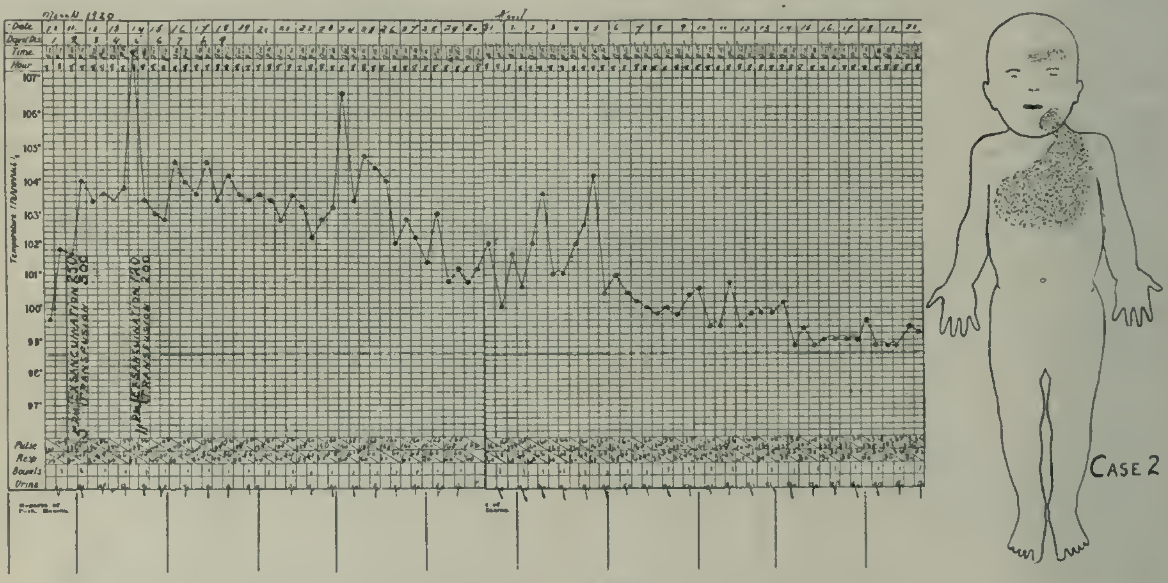

Fig. 3. (Case 2.)

Case 2. History No. 19942 E. H. Male. Age 1 year. Admitted on the afternnon of March 10th, 1920.

Three hours before admission, patient had sustained a severe scald from contact with hot jelly.

On admission, Temp. 99.3. Pulse 100. Resp. 28. General condition good, patient does not appear to be ill. There was a 1st, 2nd and 3rd degree burn of back from the 10th dorsal spine up to neck, and spreading over to the chin on the left side of face. Small area of 2nd degree burn on forehead.

March 11th. 2 p.m. Patient cyanosed and in a convulsion. Muscles in tonic contraction following convulsion with no tendency to relax. 12 c.cm. Mag. Sulph. (8% solution) subcutaneously, and Mag. Sulph. 3 drs. by mouth. Large enema when quiet.

4 p.m. Second convulsion. Muscles unrelaxed. Temp. 106.8. An hour later, exsanguination of 250 c.cm. and blood transfusion 300 c.cm. (group 4 to group 4) was carried out. Following this, the condition was somewhat improved and child nursed well.

March 12th. Relaxation still incomplete. 3rd convulsion 20 c.cm. of 5% MgSO4 given. Subcutaneously. Colour and breathing improved very shortly. Saline 200 c.cm. subcutaneously.

Note.—Extent of burned skin in each case is represented by dotted area on body outline accompanying temperature chart.

March 14th. In last two days there have been five mild clonic convulsions, to relieve which $MgSO_4$ (5% solution) was given subcutaneously. Child not taking fluids very well. Given more saline subcutaneously.

11 p.m. Exsanguination 120 c.cm.

Blood transfusion 200 c.cm. Following this, colour and general condition improved.

March 15th. Passing urine well. Had six very mild clonic spasms. Receiving high cold colon irrigations. Signs of returning consciousness are apparent as insertion of needles for subcutaneous saline causes pain.

By March 18th. Eighth day of treatment—there was relaxation of muscles, though arms were still a little spastic. Chin and head burns dry. Burned area of back sloughing, but not infected. At this time, child developed a severe lobar pneumonia, for which the usual treatment was carried out, and on April 24th, was discharged from the hospital in excellent condition.

Case 3. N. H. No. 21966 Male. Age 2 years. Admitted Aug. 10th, 1920, 7 p.m. Two and a half hours prior to admission child sustained severe burns through its clothes catching fire.

On admission, T. 100. P. 150. R. 40. Patient a poorly-developed rachitic infant, is restless and crying. Some convulsive movement of limbs, respirations rather labored and rapid, mucus in throat. Burns of 1st, 2nd, and 3rd degree—face, both arms and thighs, burn of 4th, 5th degree of right hand.

11 p.m. Exsanguination 100 c.cm.

Transfusion 180 c.cm. (donor and recipient in same group) Saline 200 c.cm. (given very slowly) (Intravenously.)

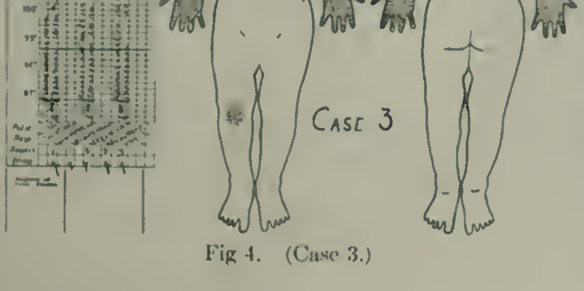

Fig 4. (Case 3.)

Aug. 11th. Patient improved. No muscular twitching, rales in chest.

Aug. 12th. At 5 p.m. Temp. 104. Condition becoming worse.

Exsanguination 20 c.cm. after which needle became dislodged from longitudinal sinus.

Transfusion. 200 c.cm.

Saline 100 c.cm. (given slowly) (Intravenously)

By 10 p.m. patient's condition improved.

Aug. 13th. No convulsive twitchings, taking fluids well, respiration rapid, but patient conscious.

Aug. 14th. Fairly well all day, till 6 p.m., when condition became worse.

Exsanguination 100 c.cm.

Transfusion 160 c.cm.

Saline 80 c.cm. intravenously.

Aug. 15th. Patient worse. Dullness at base of right lung posteriorly. High temperature, relieved for a time by cold colon irrigations. Died 6.40 p.m.

Autopsy showed intense purulent bronchopneumonia, with right base almost completely consolidated.

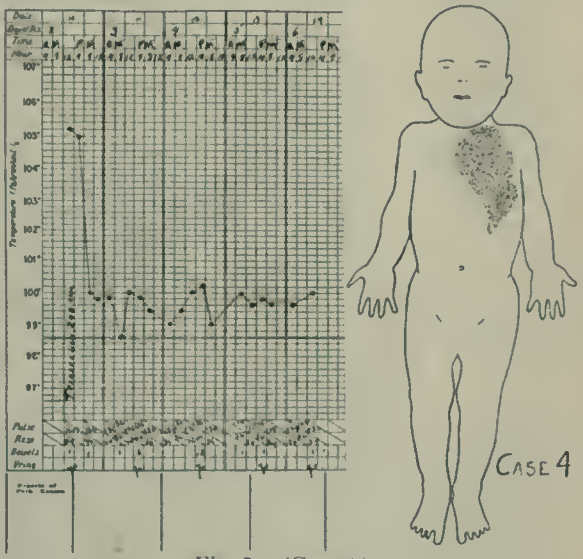

Fig. 5. (Case 4.)

Case 4. H.Y. Age 19 months.

Admitted in the morning of Dec. 10th, 1920. Two days prior to admission spilled hot coffee over the front of the chest. Patient said to be in good condition till this morning when she had two convulsions, one at 6 and one at 7.30 a.m.

On admission, Temp. 105. Pulse 160. Patient drowsy, toxic, and semi-delirious with convulsive twitchings, appears to be acutely ill. Area of burn over chest and base of neck about 40 square inches. Burn is of 1st, 2nd, and 3rd degrees.

On morning of admission, blood transfusion of 200 c.cm. was done (4% citrate) and 50 c.cm. saline were given into a vein. Following transfusion, condition improved though slight twitching of arms was present. 20 c.cm. Mag. Sulph. Sol. (8%) given subcutaneously.

Dec. 11th. General condition much improved, T. 100. Patient has lost the drowsy toxic appearance and is able to recognize her mother.

Dec. 15th. Condition improving steadily. Burned area clearing up. Discharged.

Feb. 11th, 1921. Burn well healed, and patient in excellent condition.

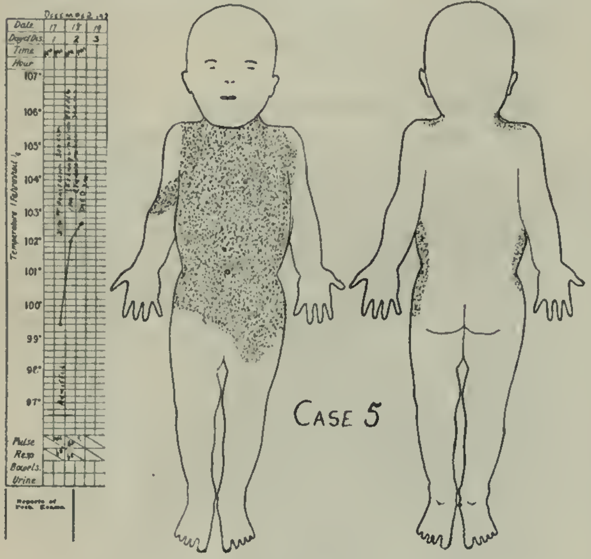

Fig. 6. (Case 5.)

Case 5. N. L. Male. Age 2½ years. Admitted Dec. 17th, 1920. 3 p.m. Scalded 2 hours before.

Severe scald over whole anterior surface of chest and abdomen.

Patient in some degree of shock on admission.

5 p.m. Recovered from primary shock.

7 p.m. Circulatory collapse.

8.30 p.m. Convulsive twitchings of arms and legs.

Transfusion 300 c.cm. Blood.

25 c.cm. Mg. Sol. (8%) subcutaneously.

This was followed by definite improvement.

Dec. 18th, 1920. 5 a.m. Convulsive twitchings 25 c.cm. Mg. SO4 (8%).

10 a.m. Condition poor but no convulsions.

1 p.m. Severe convulsion.

Exsanguination 260 c.cm.

Transfusion 300 c.cm.

Following this, patient's condition was very much improved, and he became quiet and rational.

4 p.m. Convulsive twitchings 25 c.cm. Mg. SO4 (8%).

8. p.m. Died following convulsion which lasted one hour. Necropsy refused.

Case 6. P.K. Age 1½ years.

Admitted March 1st, 1921 and still in hospital.

Scald of legs and scrotum of 2 hours duration.

Admitted in good general condition. No shock present.

March 2nd. 4 a.m. Patient drowsy.

11.20 a.m. Severe general convulsion, lasting 5 minutes, face and hands cyanosed. (Donor being searched for, father's blood incompatible.)

12 noon. Slight convulsion.

2 p.m. Exsanguination 200 c.cm.

Transfusion 400 c.cm. (foreign donor).

3 p.m. Convulsion, immediately after return

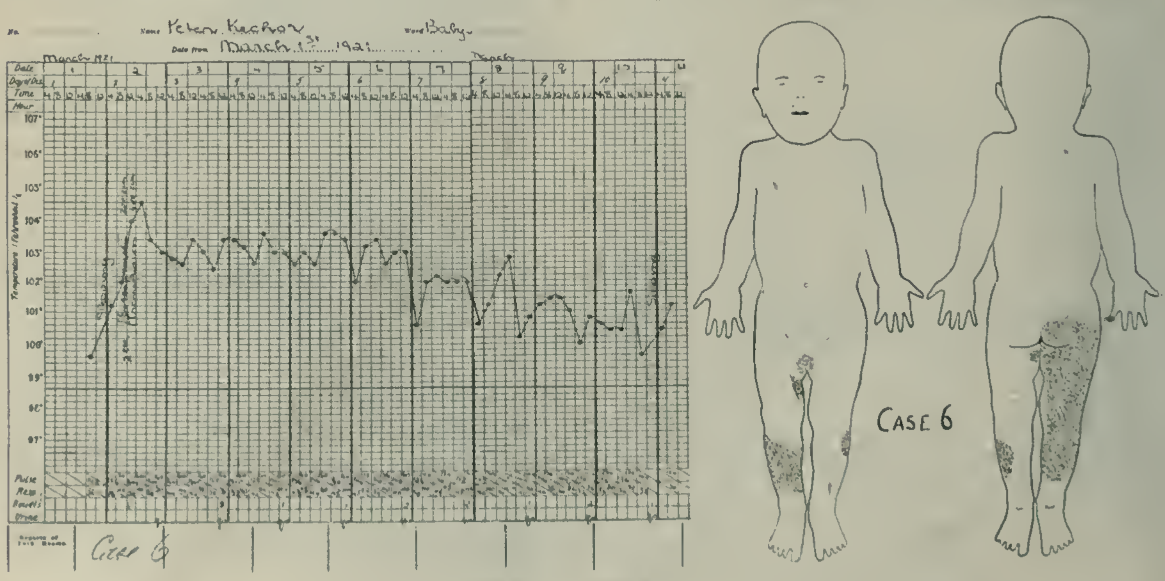

Fig. 7. (Case 6.)

from operating room. Lumbar puncture done; 45 c.cm. of clear fluid under considerable pressure. 3 c.cm. of Mg. SO (8%) introduced intraspinally.

March 11th. Steady improvement.

March 14th. Nasopharyngitis with otitis media. Burns in good condition and healing.

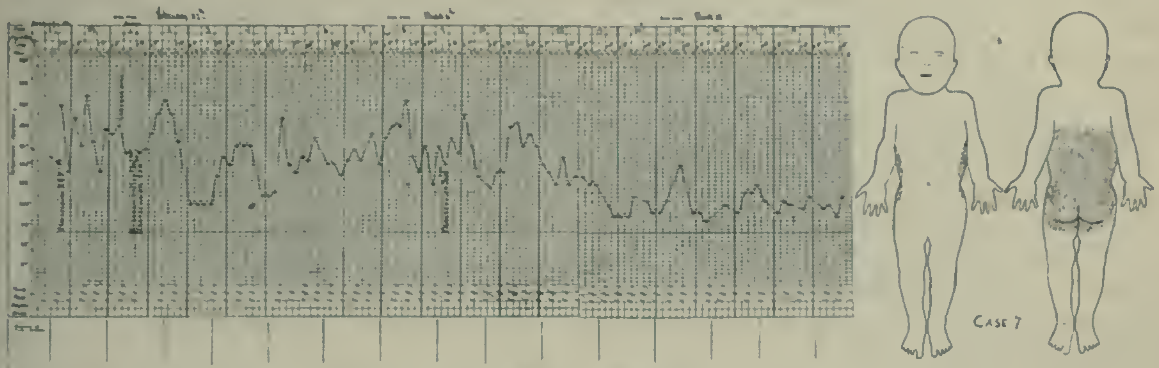

Fig. 8. (Case 7.)

Case 7. R.B., Male. Age 2½ years.

Admitted to Hospital March 27th, 1921.

Six days prior to admission, child had fallen backwards into a tub of scalding water. He had been treated at home with various local applications for a 2nd and 3rd degree burn, extending over the back from the lower angles of the scapulæ to the upper portion of the thighs, and forward to the mid auxiliary line on each side. Frequent doses of paregoric had been given for the relief of pain. He was desperately ill on admission to hospital, and the extent and severity of the burn were such that the prognosis seemed absolutely hopeless. On admission, the child was exceedingly restless and toxic. Morphia was given to control pain and borated vaseline on moist boracic lint was applied to the burns. In the hope of controlling the toxaemia blood transfusion of 360 c.cm. was done immediately.

Following transfusion, he showed moderate improvement, but the temperature remained high. Cold colon irrigations were given. These were of temporary benefit in lowering the temperature, but by March 1st the condition had become worse. The manifest circulatory collapse was treated by the giving of adrenalin m v̄ and camphor gr. 2. There was increasing restlessness, and at noon, a severe convulsion occurred. Exsanguination (260 c.cm) and transfusion (400 c.cm.) was carried out. Following this, general condition improved somewhat, but there was intermittent twitching of arms and legs. Mag. Sulph. Solution (8%) was given subcutaneously at intervals in 20 c.cm. doses for the next four days to control the spasms.

By March 3rd, the general condition was very definitely improved, and the temperature somewhat lower. However, the improvement was not lasting, and by March 6th the condition was again very poor. Patient was taking very little fluid and passing very small quantities of urine. He was restless, was at times delirious, and slept for only short periods. This state continued till March 9th, at which date it seemed that the outlook was quite hopeless. The circulation was waning perceptibly, the face and hands were mottled and bluish, and the radial pulse was at times imperceptible. The toxaemia, was obviously increasing. As a last resort, blood transfusion was carried out (300 c.cm.).

The following day, the temperature began to fall and with the exception of an occasional rise, became steadily lower. The general condition improved daily, and by March 14th the child was taking solid food. Further progress has been uneventful; at the time of writing, April 29th, there are several large granulating areas over both loins. At no time during his illness did the urine show albumin or casts. From the extent of the burn in this case, it is difficult to see how he could have lived beyond the first four days.

Admittedly, this is a very small number of cases upon which to base conclusions and the method is yet on trial, but the results from other forms of treatment in this type of case have been so uniformly discouraging that a radical deviation from former lines of procedure was warranted. We have endeavoured to determine what sign or symptom is an indication for this therapy, but such measures as examinations of the blood and urine has shown nothing sufficiently definite, so far, to point the way, and we are forced to rely upon the clinical points like rising temperatures and general evidences of increasing toxemia. The occurrence of a convulsion is a certain indication, but, unfortunately, a late one, and it would be safer to institute treatment before the toxin has been so fixed as to cause convulsion. Our experience has been that in a case under two years of age, in which the burns have been severe enough to cause a convulsion, it is rare to see recovery follow any other method of treatment.

The animal experimental work and blood chemistry in connection with this subject are being carried out in conjunction with Dr. Gladys Boyd, in the Research Laboratories of the Department of Pediatrics. The results will be reported in a subsequent paper.

Out of seven cases of severe toxic shock from superficial burns, showing symptoms which we are accustomed to consider as those almost invariably present in the fatal cases, five have recovered completely. This is considered sufficient justification for the appearance of an advance clinical report in the hope that other workers in the field might gain some advantage from its perusal.

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*Dupuytren's classification.

1. Weiskotten, H. G., *Histopathology of Superficial Burns, J.A.M.A. 72: p. 259.* Jan. 25, 1919.

TABLES RELATIVE TO THE TRANSFUSION OF BLOOD

I. Maclaren Thompson

Department of Anatomy, McGill University, Montreal

THOSE who practise the transfusion of blood endeavour to prevent undesirable sequelae by carrying out preliminary tests to ascertain the group to which the blood of the donor and that of the recipient belong. Four groups are commonly recognized, and are designated 1, 2, 3 and 4.

The agglutination reactions of these groups are expressed in the following table:

TABLE I.

		Erythrocytes			
	Group	1	2	3	4
Serum.......	1	0	0	0	0
	2	+	0	+	0
	3	+	+	0	0
	4	+	+	+	0

+ = agglutination.
0 =no agglutination.

The test for selecting a donor is frequently made by testing suspensions of the erythrocytes of the donor and of those of the recipient against standard sera of groups 2 and 3. The following table, which is obviously derived from Table I., shows how the group of each unknown blood is ascertained.

TABLE II.

Unkown erythrocytes	Serum of		Group to which erythrocytes belong
	Group 2	Group 3	
x	+	+	=1
x	0	+	=2
x	+	0	=3
x	0	0	=4

+ =agglutination.
0 =no agglutination.

Concerning the explanation of these well-known facts, much has been written. Von Dungern and Hirschfeld offer what is probably the best explanation, of which the following summary presents the essentials.

In the human species there are four varieties of erythrocytes:

(1) Erythrocytes A, which possess an agglutinable property termed A.

(2) Erythrocytes B, which possess an agglutinable property termed B.

(3) Erythrocytes AB, *each* of which possesses both agglutinable properties A and B.

(4) Erythrocytes O, which possess neither agglutinable property, neither A nor B.

In the human species there are only two varieties of agglutinins for human erythrocytes.

(1) Agglutinin anti-A, which acts upon the agglutinable property A, and therefore upon erythrocytes A or erythrocytes AB.

(2) Agglutinin anti-B, which acts upon the agglutinable property B, and therefore upon erythrocytes B or erythrocytes AB

The contents of the four groups are shown in the following table:

TABLE III.

	Ordinary Terminology	Von Dungern and Hirschfeld Terminology		Erythrocytes	Agglutinins
Blood of Group.	1	AB	Contains. .	AB	Nil
Blood of Group.	2	A	Contains. .	A	Anti-B
Blood of Group.	3	B	Contains. .	B	Anti-A
Blood of Group.	4	0	Contains. .	0	Anti-A and Anti-B

Accepting the work of von Dungern and Hirschfeld, it is apparent that Table III. furnishes an explanation of Tables I and II.

I have constructed Tables IV. and V. which, in addition to showing the facts contained in Tables I. and II. respectively, show the explanation thereof in terms of von Dungern and Hirschfeld's results, as embodied in Table III.

TABLE IV.

	Blood contains erythrocytes	AB	A	B	0
Serum contains agglutinins...	Group	1	2	3	4
Nil.	1	0	0	0	0
Anti-B........	2	+	0	+	0
Anti-A........	3	+	+	0	0
Anti-A and Anti-B.......	4	+	+	+	0

+ = agglutination.
0 = no agglutination.

TABLE V.

Unknown Corpuscles	Serum of		Group to which unknown erythrocytes belong
	Group 2 contains agglutinins Anti-B	Group 3 contains agglutinins Anti-A	
x	+	+	contains cells AB ∴Group 1.
x	0	+	contains cells A ∴Group 2.
x	+	0	contains cells B ∴Group 3.
x	0	0	contains cells 0 ∴Group 4.

+ =agglutination.
0 =no agglutination.

So far as I know, no such tables as these have hitherto been constructed. Tables IV. and V. are now published in the hope that they may be of interest to those who practise the transfusion of blood.

THE VITAMINES IN THERAPEUTICS

Why should a physician prescribe vitamine preparations if all the known vitamines can be found in natural foods? Why not simply direct the patient as to the kinds of food to eat? These questions naturally suggest themselves to thoughtful medical men at a time when so much is written on the subject of vitamine deficiency.

In favor of using the extracted vitamines there seems to be scientific evidence that is bound to command our respect. Take, for example, the work of Eddy. This keen observer found that, even though the diet of the child contained an appreciable amount of vitamine B, there was a marked stimulation of growth when three per cent. of a vitamine extract was added to the food. He explained this on the basis that an extracted vitamine is more readily available than that which is contained normally in food.

Besides, it is easily conceivable that the ingestion of the requisite quantity of any one of the vitamines as found in its natural state would entail the performance of gastronomic feats that would be far from salutary.

Altogether it does seem that a preparation of extracted vitamines, such as is offered by Parke, Davis & Company under the name of Metagen, fills an important therapeutic niche. Metagen has been subjected to carefully conducted clinical investigation and is physiologically standardized for the presence and activity of all three of the vitamines.

UNSUSPECTED SYPHILIS OF THE NERVOUS SYSTEM: ITS LABORATORY DIAGNOSIS

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IN THREE PARTS

Part II.

Continued from September issue

A classification of cases into "stages" such as primary, secondary and tertiary leaves much to be desired. The process of infection is continuous. The stages depend on tissue reactions that are notably irregular in their intensity and in the time when they appear. Such a classification is therefore based on a variable quantity and is so inexact that it fails to be scientific.

Syphilis is the one outstanding disease that lends itself to experimental methods. The date of infection, the diagnostic tests, and a specific therapy can all be accurately controlled, and therefore in studying, for example, the effect of a particular form of treatment, it is possible to arrive at conclusions experimentally accurate. In such a study it is essential that cases should be considered in groups composed of similar patients, and two important particulars that should be similar are the duration of the infection and, as we shall point out, the state of the nervous system. The classification in popular use is, therefore, not satisfactory. In an endeavour to arrive at some suitable system of classifying the cases of this series it was decided to use as a basis, the length of time elapsed since infection, the clinical features were, however, also taken into account.

The cases were classified under four types as follows:—

A.—A man with an inoculation lesion in whom the Wassermann reaction had not yet become positive.

B.—A man with an inoculation lesion or with a history of such, but with no other outward signs or history of a general infection except glandular enlargement and a positive Wassermann reaction, up to and including eighteen months from the date of infection.

C.—A man with outward signs or history of a general infection including a positive Wassermann reaction up to and including eighteen months from the date of infection.

D.—A man with or without symptoms or signs over eighteen months from the date of infection.

The types A and B include all the cases of "primary" syphilis. C cases are the acute or recent cases of "secondary" syphilis but some early "tertiary" lesions may come into this division. The D cases include not only late "secondary," but also "tertiary" and most "latent" infections.

The results of the Examination of the Central Nervous System:—

1.—The Cerebrospinal Fluid

In this investigation 1,314 cases of syphilis were examined; of these 236 had an increase in cells of ten or more per c.mm., while 135 were classed as doubtful as to affection of the nervous system with five to nine cells per c.mm. Thus 18 per cent. of these cases had a definite increase in cells and 10 per cent. a slight increase, the meaning of which was doubtful. If this "doubtful class" is abnormal, as later results seemed to indicate, then 28 per cent. of this series had altered cerebrospinal fluids. This is an average figure. The incidence of abnormality was greater in some types than in others, as shown in the following table:

TABLE SHOWING THE INCIDENCE OF ABNORMALITY IN THE DIFFERENT TYPES.

Type	Number of Cases.	Number with Definite Increase in Cells of Spinal Fluid.	Number with Slight Increase of Cells "doubtful cases."
A	144	4	17
B	371	42	38
C	512	110	50
D	287	80	30
Results expressed as percentage of cases.			
A		3	11
B		11	10
C		21	9
D		27	10

This table shows that even before the Wassermann reaction becomes positive, a few cases may have a definitely increased number of cells. At a later period when the Wassermann reaction has become positive the number of cases certainly affected, as shown by cell counts, becomes larger, and gradually mounts until during the so-called secondary period when 21 per cent. will give an abnormally high count, and 9 per cent. will show the slighter increase, and may be classed "doubtful." With regard to type D it is of interest to note that the cases without clinical signs of active syphilis, namely "latent" cases, have a higher incidence of abnormality in the cell count of their spinal fluids than have those with active lesions. This is shown in the following table.

TABLE TO SHOW SPINAL-FLUID-CELL ABNORMALITY IN TYPE "D" CASES

	Number	Number with cells increased markedly	Per-cent-age.	Number with cells slightly increased	Per-cent-age.
With active signs	112	20	17	14	12
Without active signs	175	60	34	16	9

The high percentage of increased cell count in cases without active signs (latent cases) is striking; it is twice that of the cases with active signs.

The relation of the Wassermann reaction in the cerebrospinal fluid to the various types is given in the following table.

TABLE SHOWING THE INCIDENCE OF POSITIVE WASSERMANN REACTIONS IN THE CEREBROSPINAL FLUID IN THE VARIOUS TYPES OF THE DISEASE.

Type	Number of Cases.	Number with positive W. R.	Number per cent. with positive W.R.
A	144	0	0
B	371	12	3
C	512	35	6
D	287	53	18

It is seen that in early syphilis a positive reaction in the cerebrospinal fluid was not observed until the reaction had become positive in the blood, but cases were seen which gave a positive reaction in the cerebrospinal fluid as early as four and five months after the date of infection. In type D more positive reactions were obtained from "latent" cases than from cases with active signs, this finding agreeing with the abnormality of the cell count.

It is of interest to inquire whether a positive Wassermann reaction in the fluid has any constant association with a particular number of cells. This is shown in the following table.

TABLE SHOWING THE RELATION OF THE POSITIVE WASSERMANN REACTION IN THE CEREBROSPINAL FLUID TO THE NUMBER OF CELLS.

Number of Cells in C.S.F.	Number of Cases with Positive W.R.	Number of Cases with W.R. Negative
0– 9	5	1072
10– 19	5	77
20– 49	8	43
50– 99	21	15
100–149	13	5
150–199	9	4
200–299	9	1
300–499	12	2
500–999	6	2
1000	3	0

This table shows that in the spinal fluid, an increase of cells may be found more often than a positive Wassermann reaction and that therefore a cell count is a much more delicate index of infection. There were only five cases in which a normal cell count was associated with a positive Wassermann reaction. Such a finding was unusual. In three of the five cases it could be accounted for as a result of treatment of a case whose fluid had originally been grossly altered. The other two were unusual cases in that they had had no previous treatment. Their histories are as follows:

Case 1978. Infected July, 1918. Had a penile sore late in July, and a rash early in September, 1918. Examined on October 5, 1918: Scars of sores in sulcus, general adenitis, macular syphilide. Serum Wassermann positive. Spinal fluid—506 lymphocytes+14 polymorphs, Wassermann negative.

Case 1135. Infected late in December, 1917. Examination May 4, 1918: Scars of multiple indurated small ulcers in coronal sulcus and on under surface of prepuce; Treponemata not found in either of two examinations, but local antiseptics had been applied; general adenitis; gonorrhoea. Serum Wassermann weakly positive. Spinal fluid—476 lymphocytes.

Wassermann negative. One week later the Wassermann reaction in the serum was negative.

2. The Motor and Sensory Functions of the Nervous System

The examination of the central nervous system, the internal ears and the special examination of the eyes was undertaken on a selection from the first 624 cases of this series. The following table shows the number of cases with signs or symptoms of nervous disease.

Type of Case	Number of cases with abnormal C.S.F.	Number of cases examined neurologically.	Number of cases with clinical evidence of disease in C.N.S.
A	2	2	0
B	20	16	0
C	56	47	10
D	38	34	13

Many of the abnormalities were not marked. Some typical examples are as follows:

Case 139. Complained of weakness in his legs after walking.

Case 548. For one month he had noticed that sometimes he was dizzy for a few moments after rising from a chair. He had been doing full duty in his ship until he came to hospital on account of his rash. He had no other symptoms, but his cerebrospinal fluid contained 1,000 cells per cubic millimetre.

Case 958. Insomnia, nocturnal headache, vertigo.

Case 1071. Paralysis of facial muscles on left side. Diminished sensation over area supplied by fifth cranial nerve on the left side.

The central nervous system was examined in 22 "doubtful" cases, some from each division. In only one case (Division C) was any abnormality found.

3. The Examination of the Function of the Internal Ears

The results of the examination of the internal ears may be summarized briefly by stating that in this series diminished bone conduction was not a reliable indication of abnormality of the cerebrospinal fluid.

A series of non-syphilitic controls showed so large a percentage with similar diminished bone conduction that the finding was rendered valueless in syphilitics.

This is not in accord with the results shown in the series of Wile and Stokes.

4. The Examination of the Eyes

The following table shows the frequency of pathological findings in the eyes of cases with positive cells:

Type	Number of cases with abnormal C.S.F.	Number of cases whose eyes were examined	Number of cases with abnormal eyes
A	2	0	0
B	20	4	4
C	56	29	19
D	38	20	17

These examinations were made by Surgeon-Commander R. J. E. Hanson, F.R.C.S., R.N.V.R. who was able to recognize certain early but well defined changes in the eye grounds of these cases. The following are his notes of this condition:

"Retinitis ex Lue" (Early Stage)

Typical Signs.—The conditions vary in their intensity, but three types of signs in the fundus oculi were noted:

(1) *Hyperaemia.*—The retinal venules especially were overfull.

(2) *Engorgement.*—Enlargement and cloudy appearance of the perivascular lymph spaces around the retinal vessels and around the papilla. (Luetic halo.)

(3) *Pigment Overgrowth and Disturbance of the Retina.*—Small rounded woolly-looking opacities with fine spidery connective tissue changes, without apparent upset of the functions of the rods and cones.

In relation to No. 2 above, it is interesting to recall that there are physical and chemical changes in the cerebrospinal fluid, and that this is intimately connected with the subarachnoid contents, and these last with the retinal lymph-sterams.

With regard to No. 3 above, one recalls the extensive pigmentation changes in the skin lesions of the secondary stage.

Summary.—There was little evidence of interference with function—i.e., with fields, form-sense, light difference, and colour thresholds. No alterations in the fundus oculi were observed in the cases seen shortly after the appearance of the innoculation lesion. In the latter cases the changes in the fundus oculi were:

(1) Symmetrical.

(2) Mainly peripheral.

(3) Diffuse and not circumscribed, i.e., not more marked nor intense at one part of the periphery than another.

No hyalitis nor choroiditis was observed but an underlying condition of choroidal endarteritis may be present in these cases of stippling of the fundus oculi.

STANDARDISATION OF CERTAIN PREPARATIONS OF DIGITALIS*

D. S. Lewis, M.D., and C. F. Moffatt, M.D.

Owing to the irregularity of the clinical results following the use of digitalis in this hospital, due allowance being made for varying clinical indications, it was thought advisable to standardise the preparations used in the wards. Later this was extended to include a number of preparations commonly employed in Eastern Canada.

Seven tinctures and the infusions made from five different lots of digitalis leaf were examined, as well as certain of the active principles.

The work of Pratt,[1] Warfield,[2] Rowntree and Macht,[3] in America, and of Symes[4] and others in England has shown how great may be the differences in the strength of so-called official preparations. One of the basic reasons for these variations is the difficulty of measuring the activity of the drug. The drug cannot be analysed by direct chemical means, but its strength must be determined by its action on experimental animals.

There are two methods of assay, the "frog method," suggested by Houghton[5] in 1898, and the "cat method" introduced by Hatcher and Brody[6] in 1910. The former method is advised by the Pharmacopoea and has the advantage of economy, while the latter has the advantage of giving results which can be applied more directly to the use of digitalis in man. In the present studies we have made use of a slightly modified "cat method" described by Rowntree and Macht.

Method

A healthy cat weighing preferably from 1.5 to 2 kilos. is etherised, and a needle connected with a burette is inserted into the femoral vein. The cat is kept sufficiently under ether to prevent struggling, and the solution is run in at the rate of 2 cc. per minute for the first five minutes, and then 1 cc. every 2 minutes until the heart stops. The infusions are used in full strength, but the tincture should be diluted to ten volumes with salt solution, and the active principles should be injected after being dissolved or suspended in salt solution. The total amount injected divided by the weight of the cat, gives the Minimal Lethal Dose (M.L.D.) of the preparation per kilo. of cat, and from this is calculated the amount of digitalis leaf represented by the preparation. During the injection the heart rate is counted by stethoscope, and notes are made of the quality and rhythm of the sounds. The respirations and general behaviour of the animal (retching, etc.), are also noted.

The following is a typical experiment:

Tincture No. 2. (Diluted 1:10).
Dec. 29th, 1920. Healthy cat, weight 2.58 kilos. Light ether.

Time.	Rate Injection	Pulse	Remarks
3.21	Injection started	208	
3.26	First 10 cc. ended	160	
3.28	1 cc. injected	144	
3.30	1 cc. "	140	
3.32	1 cc. "	124	
3.34	1 cc. "	164	Extrasystoles
3.36	1 cc. "	216	Heart regular again
3.38	1 cc. "	225	Retching.
3.40	1 cc. "	?300	
3.42	1 cc. "	?300	
3.44	1 cc. "	?	Sounds very weak, irregular.
3.45	Heart stopped, Breathing continued 30 secs. longer.		

Total amount injected. 19 cc.
Amount per kilo...... 7.4 cc. = 0.74 cc. undiluted tincture.
= 74 mg. digitalis leaf.

This experiment shows all the characteristic features, an initial slowing, which is due partly to vagus stimulation, followed by the appearance of extrasystoles, a rapid increase in rate as the action on the heart muscle becomes stronger, retching, finally ventricular fibrillation and a cardiac death. The respiratory centre continues to function for some seconds after the heart stops.

Two or more determinations are made of each

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specimen, and the average of these is taken to represent the strength of the drug. The results are stated in milligrammes of digitalis used, per kilo. of cat, the stronger the preparation, the smaller will be the amount necessary to produce a fatal result. In 1910 Hatcher and Brody found the average "cat unit" (amount of digitalis per kilo. necessary to stop the heart) of a good specimen of digitalis leaf, to be between 80 and 100 mg. and this quantity is still accepted.

PREPARATIONS

The tincture is prepared by extracting 100 gms. of digitalis leaf with 1,000 cc. of dilute alcohol, and roughly speaking the B.P. and U.S.P. tinctures are interchangeable. The infusions, however, differ in strength and in their mode of preparation. The B.P. infusion is made by infusing 7.5 gms. of a No. 20 powder for fifteen minutes in a litre of boiling water. The U.S.P. calls for the use of 15 gms. of unpowdered leaf, and its infusion with 500 cc. of water for one hour, and its subsequent dilution to 1,000 cc. with dilute alcohol and cinnamon water.

Hatcher[7] has proved recently that infusions prepared by the latter method are very irregular in strength even when made from the same batch of leaves. His more accurate method was published after the completion of our work, and the infusions here reported were made by the usual procedure of infusing coarsely powdered leaf in B.P. proportions.

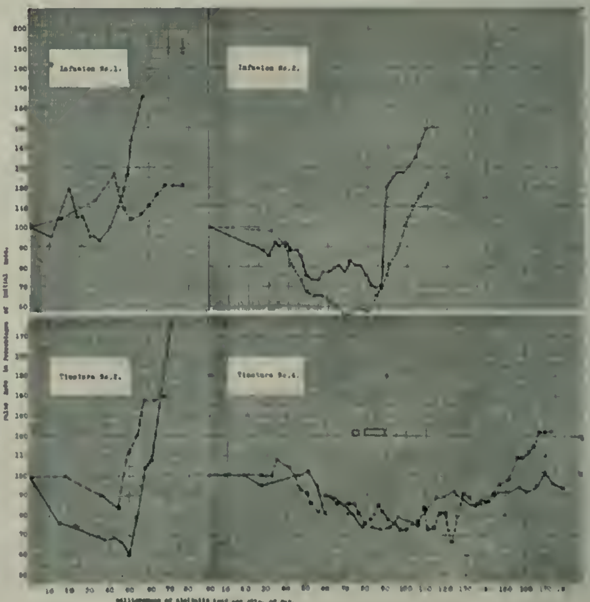
TINCTURE OF DIGITALIS

The tincture represents the activity of the leaf completely, all three principles, digitalein, digitalin and digitoxin being soluble in the dilute alcohol used in its preparation. It was found that four of the seven (Table I.) showed a strength quite in keeping with the standards of a good tincture, that is, 1 cc. of tincture (100 mg. digitalis leaf) or less, constitutes the minimum lethal dose per kilo. of cat. Some indeed were much stronger, requiring only from 0.7 to 0.8 cc. per kilo. On the other hand one concentrated tincture (No. 1) was almost 60 per cent. below its reputed strength, and one tincture of B.P. strength (No. 4) was 78 per cent. below standard. A third was 14 per cent. under strength, so that three out of the seven preparations were notably below standard. This conforms closely to the results obtained in other centres. The low strength of the concentrated tincture is of interest in view of the reports of Symes (4) that tinctures much above strength almost always show more rapid deterioration than do those of standard activity. The concentrated tincture may be more reasonably priced, but its stability is in some doubt.

TABLE I.—TINCTURES OF DIGITALIS

Preparation.	Total Assays.	M.L.D. in mg. Digitalis leaf per kilo. of Cat.	*M.T.D. in mg. Digitalis leaf per kilo. of Cat.	Extrasystoles.	Maximum Slowing per Min.	Vomiting.
Tincture No. 1..	2	155	72	++	104	−
" No. 1a.	1	89	51	+	96	−
" No. 2..	2	71	48	+	58	+
" No. 3..	3	83	46	++	28	−
" No. 4..	2	178	81	+	66	−
" No. 5..	3	86	42	+	39	++
" No. 6..	2	73	49	+	54	+
" No. 7..	1	114	55	+	60	−

A study of the response of the heart, as gauged by the pulse rate and the appearance of irregularities, etc., shows a difference between the various preparations. One or two of the tinctures produce practically no slowing of the heart rate and few if any extrasystoles, while others cause a drop in the rate to half its initial value, followed by a more or less sudden rise to the



final tachycardia which immediately precedes the fibrillation of the ventricles. (See charts). Although these are well recognized digitalis effects we are unable to decide whether or not these differences have any importance in the therapeutic efficiency of the preparation, but the lesser grades of slowing are seen usually in the more toxic or more active tinctures, and it is possible that the period of vagus stimulation is passed very rapidly during the first five minutes when the drug is being injected at the maximum speed.

INFUSIONS OF DIGITALIS

The infusions are not so satisfactory, they are difficult to prepare, and Rowntree and Macht[3] have showed how the strength may vary even when made from the same leaves but with slight variations in the method employed in their preparation. The chief difficulty, however, has been to obtain anything like a fresh batch of reliable leaf. Two of the specimens of Allen's leaf had been obtained before the war, and on one of these the certificate was dated February, 1910. The retailer as a rule has no knowledge of either the brand or age of the leaf which he employs, simply ordering so much leaf from the wholesaler, and receiving whatever is in stock at the time. One such specimen looked more like the sweepings of a weed bin than a pharmaceutical preparation. In only one case was the leaf of recent date, and this gave a titre practically as high as any of those tested, either tincture or infusion, namely 74 mg. per kilo. The minimum lethal dose of the 1910 leaf was 112 mg. per kilo. but the others varied from 15 to 40 per cent. below standard.

TABLE 11.—INFUSIONS OF DIGITALIS

Preparation.	Total Assays.	M.L.D. in mg. Digitalis leaf per kilo. of Cat.	*M.T.D. in mg. Digitalis leaf per kilo. of Cat.	Extrasystoles.	Maximum Slowing per Min.	Vomiting.
Infusion No. 1...	2	74	35	−	12	−
" No. 2..	2	112	56	+	69	−
" No. 3...	2	107	48	+	47	−
" No. 4..	3	117	58	++	54	+
" No. 5...	3	132	64	++	61	−

*Amount necessary to produce extrasystoles or the maximum degree of slowing of heart rate.

In practice it seems that the infusion has much against it. It is difficult to prepare, and the initial certificate bears little relation to the potency of the finished product. Tinctures on the other hand are readily made from any active leaf, and the results of the present investigation have shown a satisfactory strength in four of the seven tinctures. Two of these were made by Montreal houses, a third was an English tincture and the other was prepared in the Middle West. In every way the tincture is the more satisfactory preparation.

STROPHANTHIN

Levene[8] shows that French Ouabain (Arnaud) has almost twice the strength of the strophanthin sold in New York. The minimum lethal dose of the latter is 0.0001 gm. per kilo. Similar products obtained in Montreal show an even greater loss of potency, the fatal dose averaging 0.00017 gm. that is about 70 per cent. below even the American strength. This weakness of the drug depends in large part on its age, Levy and Cullen[9] having shown that strophanthin if sealed in soft glass ampoules rapidly loses strength due to the breaking down of the glucoside in the faintly alkaline medium which results from the solution of the glass container.

Strophanthin is a dangerous drug even at the best, and this variability does not add to its value as a cardiac remedy.

DIGITALIN

The hypodermic tablets put up by a well known firm were dissolved and suspended in normal salt solution, and this suspension was injected in the usual way.

The results confirm those already reported, namely that digitalin often has little therapeutic strength. The usual dose of the drug is from 1/100 to 1/60 grain. In the preparation tested the minimum lethal dose was found to be 0.0081 g.m (1/8 grain), and the minimum toxic dose 0.0047 gm. (1/15 grain) per kilo.

Of what use then would any such preparation be when given in doses of 0.000016 gm. (1/3,600 grain) per kilo. as is the usual practice in medicine. Until a more active and reliable form of digitalin has been found, this drug can have no place in cardiac therapeutics.

Summary

1. Seven tinctures and five infusions of B.P. strength were tested in twenty-eight different experiments by means of the "cat method."
2. Four tinctures were found to be of satisfactory strength. Three were notably weak. One or two tinctures produced few objective signs of digitalis action while others had a sudden explosive-like toxic action.
3. The infusions were not so satisfactory as the tinctures, only one preparation coming within the standard.
4. The active principles tested, strophanthin and digitalin, were much below standard, and not found to be reliable.

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RESEARCH IN MEDICINE *

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IT is a difficult task to carry a message, even to the intelligent, educated human, immediately after his annual dinner. One must be entertaining and slip across the secret of his intention, disguised by condiment, or its potency is lost, because the patient refuses to take it. And so I have written what I wish to say, in the hope, that if but a fragment of the truth which I trust it contains remains, you will refer to the written text for another dose.

So great a stimulus was given to research by the necessities of the war through which we have so lately passed, that even a body so varying in the character of its personnel, as the American Federation of Labor, has seen fit to pass resolutions urging that part of its funds be spent in the development of new knowledge. True research, however, cannot be developed by the appropriation of funds alone. The ground work of the human family must flash forth sparks of genius before true research is likely to develop. The war took from our midst many potential servants of that elusive mistress—research.

We may agree with the English Historian, Buckle, that progress depends upon skepticism and only retardation of progress results from the restriction of governments. I feel that if Buckle lived to-day he would include also the restriction of great monetary foundations. Or we may believe his view—"that there is a spiritual a poetic and, for aught we know, a spontaneous and uncaused element in the human mind which ever and anon suddenly and without warning gives us a glimpse and a forecast of the future and urges us to seize truth as it were by anticipation." Or, on the other hand, we may follow the belief that universal education will produce more travelers into the unknowable field and so provide by the summation of their excursions the elysian fields we look for. But these are for the moment unimportant; for true it is, in spite of the fact that we have, during the last half century, made universal education the goal, not only of governments for their peoples but also of voluntary organizations of technical and semi-technical character, that we have not yet found the secret of producing research workers at will.

Universal education has had one curious influence epitomized by Sir Almroth Wright at breakfast one morning in Paris, "You Americans do so much sham research. You make one thousand blood counts, one thousand urine analyses, one thousand ovariotomies, and add them together and think you have produced research." I have always thought that he suffered on this particular morning from hyperchlorhydria, which, as you know our great physician and teacher, Sir William Osler, declared was a reason for excluding individuals from contact with their fellow men until the luncheon hour. Wright's remark followed a dissertation upon his attempts to reduce the ten divisions of decalogue to three comprehensive ones of his own. Wright, like his friend Shaw, has the power, in satirical phrase, of making a shred of truth appear as the whole truth, and while he created a laugh at our expense, he offered nothing which would enable us to construct the pathway out of our difficulties.

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* Read before the Ontario Medical Association, Niagara Falls, June, 1921.

A single example will show that less than a thousand analyses on the method laughed at by Wright resulted in the evolution of a great law, and this example occurred within the lifetime of every member of this Association.

In 1900 Dr. Edward Cowles established at McLean Hospital for the Insane, at Waverley, Massachusetts, a chemical laboratory. To this was invited a young chemist, Otto Folin, to undertake the study of metabolism in connection with insane patients. The underlying approach to metabolism at that period was urine analysis in a patient with nitrogenous equilibrium and a known intake of nitrogen and other elements. From this base Folin started, only to find that there did not exist in the world in 1900 a single complete analysis of human urine. To this task he set himself with patience and new methods, placing his results in tables day after day. I am not sure that his examinations either reached or exceeded one thousand, but from his columns it was at once apparent that his Kreatinin nitrogen and his neutral sulphur remained constant, whereas his other compounds varied with the intake of food. From this patient study there was evolved on a sound basis his law of endogenous tissue metabolism and exogenous or intermediate metabolism; so that Wright's criticism of one of our methods is not the whole truth. Even method of procedure, however, is dependent upon the brains of the man who follows it.

If we next turn our attention to a search for common factors in those who have produced what may truly be called research, resulting in great steps forward, we are, I think, forced to conclude that these lie not within the hands of man but in the hands of God.

Let us take a few examples and measure them by such common factors as we have—for example, parentage, position in the family, type of education, memory, opportunity, and faculty of generalization. Let us take a few of the giants among the ancients, as well as a few among the moderns, about whose achievements there can be no question. The names I choose are known to us all: John Hunter, Vesalius, William Harvey, Mendeljeff, Mme. Curie, and Emil Fischer.

John Hunter was the youngest of ten children. Little is known of his parentage. His father died when he was ten years of age. His early education was neglected. Prior to his journey to London at twenty years of age, to take up the study of anatomy, at the request of his brother William, he was a ships' carpenter. He disliked and had little knowledge of Latin and Greek, yet these were the source of recorded knowledge at that time. He made his own opportunities, however, and created the nucleus of the Hunterian Museum. He had the power of observing everything, bringing all his observations under one point of view, and then of filling in the connecting links of their correlation. Memory was one of his outstanding faculties and

> "He was one whom, not to sleep, allowed the
> needy time;
> To whom repose was lost and sport a
> crime."

And there is scarcely a field of biology which he has not enriched.

William Harvey was the eldest of nine. His parentage was most respectable, his father reaching the position of mayor of his village. He was given every advantage of education for his time, at Canterbury, Cambridge, and then at the great medical school at Padua. Opportunity was open to him by marriage and associations. At the age of fifty, after years of labor and difficulty, he gave to the world our knowledge of the circulation of the blood in "De Motu Cordis,"[2] published on the foreign press at Frankfort-on-the-Main. He was eccentric, doing much of his thinking in caves which he had prepared beneath the ground that he might meditate there in the darkness. His memory was magnificent, and his power of generalization highly developed. Obviously, from these two examples no argument for great families can be deduced by those parents who seek to give birth to genius, for Hunter was the last of ten children while Harvey was the first of nine.

Andreas Vesalius was born of a long line of eminent physicians; his great grandfather, his grandfather, and his father; two of these reached the dignity of physicians to Royalty. He had a perfect knowledge of Greek and Latin. His position in the family is unknown. His education was excellent, he being taught by great teachers in the University of Louvain. His principal teacher was Sylvius. He was condemned by the Inquisition and saved by Philip, who made the condition of his salvation a pilgrimage to Jerusalem. He later had every facility for research afforded him by his chair of Anatomy at the medical center at Padua. He died at the age of fifty, shipwrecked on the Island of Zante. He opposed in his teachings all that had preceded him and yet at the age of twenty-eight appeared his "De Humani Corporis Fabrica," which created for him the position of father of human anatomy. These men came in the beginning of things as the world emerged from its dark ages.

Let us now take three of the giants within our own time in our search for the elusive something which we would create if we could:—Mendeljeff, Curie and Fischer.

Mendeljeff, born in Siberia, the youngest of fourteen children, came from a mixture of Russian and Mongolian blood. His parentage was of the lowly priesthood of the Greek church. His father secured his name of Mendeljeff from dealing in horses. His mother, however, belonged to a family in which was great initiative, for they introduced the manufacture of paper and glass into Siberia. His father died of consumption when Mendeljeff was twelve years old. The glass business on which they depended for a livelihood was destroyed by fire and his mother, with himself and his sister, left Siberia for Moscow. His education from this time on, owing to his own honest and hard work, was of the very best, finishing in Rengault's Laboratory in Paris and in Bunsen's in Heidelberg. At about twenty years of age, Pirogoff, the surgeon, passed the sentence of death upon him and sent him south suffering from consumption. He hated Latin and Greek and would never study them. His power of generalization was enormous, but most outstanding of all was his amazing industry. At the age of thirty-two he gave to the world his immortal paper, the foundation of the Mendeljeff Table "On the Relation of the Properties to the Atomic Weights of the Elements."

Mme. Curie, the most amazing woman of our time, the greatest woman scientist of all time, is specially interesting because we have the privilege of honoring her in America to-day. She created a new science of radio activity by the discovery of radium. She has opened the door to a new field broader than any other single one in the history of science. Her father was a doctor in the High School at Warsaw in Poland. Her mother died when she was very young, and this, added to life under Russian domination of Poland, brought little to her early life but misery. It gave her, however, one outlet in her father's laboratory, but soon she was robbed of even this comfort for, being entangled in the revolutionary spirit of the Poles against Russian oppression, she was forced to flee from her native land and took refuge in Paris. Here she lived on ten cents a day gathered from private tutoring. Later she obtained the position of bottle washer at the Sorbonne. From washing bottles she advanced to setting up apparatus and thus came to the notice of Poincare, a brother of the former French president. From this time on through her work with, and marriage to, Pierre Curie, her genius has shone undimmed. For the mothers of to-day who complain of the burden of children, it may be said that Mme. Curie, either because or in spite of her two daughters, has reached her present position. Opportunity would seem to have been impossible for her but she created it.

Finally we come to the greatest chemical investigator probably of all time—Emil Fischer, who has recently died. He was born in the lap of luxury in Prussia, with its too perfect system of instruction, and received an education that could not be surpassed. He came in contact with great teachers, Van't Hoff, Baeyer, and Hoffman; equipment and opportunity never before provided to one man were his. With great power of generalization he approached the analysis of the three great groups of animal food; fats, carbohydrates, and proteins. The construction of two of these groups, carbohydrates and proteins, by labor at both ends, analysis and synthesis, he has practically solved, carrying us farther on our journey in the inscrutable fields than any other single man. New methods were the weapons of this attack.

From these few examples it is obvious that we can fix upon no common factors unless they be memory and ability to devise new methods, but even these we cannot produce at will. It is therefore unlikely that we can at an early date produce the complete researcher without whom research is impossible.

This need not deter us in our program of universal education, nor in our research for better methods of education, nor in our attempts to produce more qualified persons in this field of work.

But there is another angle of approach and assistance for us. In addition to our union for democratic governmental purposes, we have bound ourselves in a great series of voluntary unions for the avowed purpose of helping on the welfare of mankind as well as ourselves. No age has seen such a growth of national and provincial state societies as ours. Such voluntary bodies have all the freedom of action which government unions lack, but they only begin to realize what can be accomplished if only a percentage of all their funds be devoted to the stimulation of search for new knowledge—ten percent. probably; that portion which the Jewish prophets called their gift to the Lord.

Our governments have in many instances established research laboratories, but they still travel in the old belief that they need only appropriate funds and say, "Let there be Research." It does not follow with such an Aladdin touch. A search through the brilliant periods of history does, however, suggest a way for the recognition and subsidy of genius when it appears. The method of the renaissance of Italy, France and England. The method of Lorenzo de Medici, the Magnificent of Florence.

As an example of what I mean, the National Tuberculosis Association of the United States last year appropriated twenty thousand dollars, about one-tenth of its income, and appointed a small committee to expend it on medical research. Of this committee I have the honour of being chairman, the other two members are Dr. Allen K. Krause of the Johns Hopkins Hospital, and Dr. Paul A. Lewis of the Phipps Institute of the University of Pennsylvania.

After careful study, this Committee decided to follow the method of the Renaissance, even though they were possessed of neither court nor great wealth. At least they could make small appropriations to those whom the National Association recognized as worthy of assistance, small appropriations to be used for new assistants or for materials with which to work. They could signify to the university or laboratory in which a recognized research scholar was working that in the opinion of the National Association the work which the chosen men were doing reached the grade of national recognition. They could thus hope to stimulate the spirit of the student life from which must come, in the main, our research workers. They could in time repay with greater freedom, those who devoted their lives to increasing the sum of human knowledge.

Our first year of work has passed. We recognized two men: one a man of over fifty, Dr. William Snow Miller of the University of Wisconsin, whose life long work has been devoted to the study of the lymphatics of the human lung. He has much unpublished work of value to the human race, and his studies underly our knowledge of the spread of tuberculosis infection as well as our interpretation of X-ray plates on which we base so many opinions in diagnosis to-day.

The second man is Dr. Esmond R. Lond of the University of Chicago, who has undertaken to solve the fundamental problems of nutrition of the tubercle bacillus. In the media on which his organisms grow he permits only one method by which the bacillus may secure its nitrogen, and thus by elimination he has been able to find the method of election of each group. I need not describe further his work to you. His paper will be prepared and read before our Association in June in New York as will also the paper of Dr. William Snow Miller.

I hand on the suggestion of this our adopted method revived from the past, to you—one of the great voluntary organizations of Canada—in the hope that its motive may spread. It seems to me that with the initiative coming from great volunteer organizations there may be established some preventive to keep governments from being lulled to sleep by the burdensome character of their machinery, and that by the very freedom of action of these volunteer bodies there may be stimulated in our university student bodies the quest for paths in the unknown fields, and, in the teachers, the spirit to develop in contact with the students, that unknown something which may bring us year after year the creativeness that made the glory of the Renaissance.

I consider it a great honor to have been here, associated with my friend, your president, Dr. Mullin, and I trust I have not burdened you with too tedious a discourse.

ENCEPHALITIS LETHARGICA

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I HAVE no intention of giving a dissertation on this subject, but thought it might be interesting if I reported the cases which have been thus diagnosed in the Montreal General Hospital up to the present time. There has been no epidemic, but these cases have been occurring sporadically, the first being in October, 1919.

As has been often noted there are no pathognomonic signs or sypmtoms, and probably the only cases about which there can be absolutely no dispute are those in which the lesions are demonstrated on the autopsy table.

Fortunately this is not always possible as many recover, so that each case has to be judged by itself, and the diagnosis is made rather by exclusion of other causes for the nervous symptoms present than positively by the presence of any definite symptoms or signs.

Of course, in cases where there is a febrile onset with headache, delirium of an occupational character, transitory diplopia, paralysis or paresis of some limb or limbs, with possibly a cerebro-spinal fluid under pressure and containing an increased number of cells, the diagnosis is not difficult, but it is the atypical and often less severe cases which give room for discussion and doubt, so that in some cases diagnosis may rest on reasons not much if any more conclusive than, "If it is not that, what is it?"

There have been under treatment in the hospital fourteen cases of which four have died. In all these cases, except one which will be mentioned, syphilis was excluded, the Wassermann reaction being absent in both blood and spinal fluid. In some cases the cerebro-spinal fluid was under pressure, in some not. In most there was a varying degree of increase of cells, but even with an increase in the number of cells, the globulin reactions were at times absent. In some the blood showed moderate leucocytosis, in some none.

Of the four fatal cases two were the first cases of this disease known to have been admitted to the hospital. Both of these cases were foreigners though living in Canada for some time, one being an Austrian, the other an Italian.

The former was admitted almost moribund and died the same day. He showed marked external strabismus and paralysis of the seventh nerve and left arm. His pupils were unequal and inactive. His cerebro-spinal fluid was turbid and gave the highest cell count recorded, 510 per cubic millimetre. His temperature rose before death to 105-2/5. This was the most acute case noted as the illness apparently only lasted eight days.

In the second case recorded the disease ran a more chronic course, that is of about three weeks from the time he left off work, but he gave a history of increasing headache for about two months before this time and of increasing drowsiness. These symptoms with delirium, retention of urine and diminished sensation over the whole body, except the face, were the most marked during the course of the disease, and a notable feature was that it was only a day before death that any weakness of the cranial nerves was noted: at that time there was a divergent squint and the left side of the face seemed paretic. At first the only pathological reflex was a slight Oppenheim on the right, but later the knee jerks disappeared and there was a slight Babinski on the right side. There was a very high antemortem temperature, 108-2/5. The cells in the cerebro-spinal fluid were increased at the three counts made (70 to 162), but at first the globulin tests were negative.

In both these cases the brain showed oedema and sections showed collars of lymphocytes around the blood vessels and lymphatic infiltration of the pia-arachnoid.

A third fatal case was in a woman aged 47. In her case the most marked signs, loss of sensation over the whole body with general weakness of all limbs, though no paralysis existed. The pupils were unequal and reacted sluggishly to light. She died rather suddenly and no autopsy could be obtained.

The fourth fatal case was the only case in this series in which syphilis was shown to be present: his blood gave a strongly positive reaction. This was also the only case in this series in which there were marked choreiform movements present. These movements formed a prominent feature in his symptoms. He was restless and irrational rather than lethargic. In this case there was a history of double vision before admission, but no inequality of eye movements were noted during his stay in the hospital.

As this case is being considered by Dr. A. H. Gordon in his paper at this meeting, I will not mention it further.

Of the non-fatal cases two were cases of the more typical symptomatology, but of less severe grade and both made almost perfect recoveries before leaving hospital. In one the diagnosis was obscured at first by a history of previous syphilis, but Wassermann tests on blood and cerebro-spinal fluid were negative and he recovered without any antisyphilitic treatment.

Another case was in a member of the medical profession and showed onset with general symptoms of gastro-intestinal disturbance of diarrhaea and intestinal pain followed by constipation. He entered the hospital about ten days after the onset of the disturbance with fever of 101, rising the next day to 102. This fever gradually subsided but there was more or less fever for about two weeks. He showed much drowsiness and delirium of an occupational character, answering telephone, giving anaesthetic, etc.

In this case the localizing symptoms were principally referred to the legs, especially the left leg. There was great complaint of pain at the onset in the left thigh, especially the lower third, coming on in very severe spasms, comparable to lightning pains. There was a point of extreme tenderness just above the inner condyle. X-ray of this leg was quite negative. The motor signs never amounted to paralysis, nor was there any wasting of the muscles, but the left knee jerk was diminished and the left cremasteris could not be elicited. There was no ataxia in heel to knee test.

He made a good recovery.

There have been two cases ascribed to this disease in the hospital in each of which there was hemiplegia associated with bloody cerebro-spinal fluid. Both of these cases were in healthy young girls, one of 16, the other 14 years old. In both search for other conditions which could cause such haemorrhage were negative. One of these cases had a right sided hemiplegia with transient aphasia, the other a left sided hemiplegia with sensory loss over the affected side. In both the hemiplegia was complete with hypertonus and pathological reflexes. This condition gradually improved so that when they left the hospital there was practically no paresis present in either case.

One of these cases showed slight optic neuritis more marked on the side of the central lesion.

The other case showed on one occasion bilateral clonic spasm of the facial muscles lasting two or three minutes. This was not accompanied by loss of consciousness but was apparently not recognized by the patient.

There has been one case of the disease apparently affecting principally the pontine region. This man after almost a month of digestive disturbance with vomiting and nausea, noticed burning sensation in the fingers and toes more marked on the right than the left side. He had headache but at no time showed abnormal drowsiness nor did he have any sensation of fever.

On admission three or four days after onset of weakness he showed paralysis of the left side of the face and paresis of the right side of the body. His tongue was protruded to the right. His blood pressure was 134 to 80. His glands were generally palpable and his spleen was palpable three finger breadths below the costal margin. He still had subjective sensation of tingling in the fingers and toes, but objectively there was no change. Both arms and legs showed marked general weakness and he was only able to walk with help and was ataxic. Ataxia was also present in the arms. At first Rhomberg could not be tested as he was unable to stand but later it was positive and he fell forward. His epigastric and abdominal reflexes were absent and also his knee jerks, but there were no positive abnormal reflexes. Later he developed diplopia and a weakness of the left external rectus was noted. Kernig's sign became positive, more marked on the right side. He developed slight nystagmus on looking to the left. He gradually recovered and left the hospital with only very slight signs of ataxia. His knee jerks were still diminished. His cerebro-spinal fluid never showed any increase of cells and of the globulin tests the only one positive was Pandy.

Diagnosis was made on the history of gradual development of paresis and ataxia with practically complete recovery in the absence of any other cause discoverable for such an affection in the patient.

One man, aged 50, presented himself with complete paralysis of both facial nerves which had lead to marked conjunctivitis in both eyes. His face was completely mask like. The ears were examined and disclosed no cause for the facial paralysis. This paralysis had commenced about two weeks before admission. One month before admission he had had shooting pains in both legs and cramps in the soles of the feet and at about the same time he stated that he had had transitory diplopia. During his stay in the hospital at first the temperature was irregular, reaching 100 as the highest but usually reaching 99 every day until shortly before discharge. He showed some drowsiness but few general symptoms.

His abdominal epigastric, and cremasteric reflexes were absent at admission and there was a doubtful Oppenheim, but no other abnormal reflexes.

He made a practically complete recovery being in hospital about five weeks.

His cerebro-spinal fluid was not under pressure: it contained 41 cells per c.m.m. but globulin tests were negative. Wassermann was, of course, negative. There was no leucocytosis.

One patient, a woman of 28, was admitted in March, 1921, giving a long history and is apparently a chronic case.

The symptoms began rather acutely about fifteen months before admission. From that time she had been more or less ill, at times showing drowsiness, at others sleeplessness. Her movements had become slow as if her mind was on something else. She did not care to talk unless answering questions.

On admission she showed this mental sluggishness. Her pupils were inactive to light. Her abdominal reflexes were absent on the right side and there was a Babinski reflex on the left. She showed no improvement while in the hospital.

Two cases have shown the presence of glycosuria without the history of such condition being present before. However in one case there was a history that for two years he had suffered at times from blurred vision, headache, and a feeling of general weakness. These attacks would last for a varying period from a day to two weeks. In the intervals he felt well, but he had frequency of micturition and constipation with some itching of the skin during the two years.

About two weeks before admission he began to suffer from pains in the back of the head and in the shoulders, shooting in character and more or less constant. During the following week he noticed that he felt weak, was easily tired and had blurred vision. The headache was more or less constant and increasing and he was in bed for about a week before coming to the hospital. There was an *indefinite* history of diplopia as he stated that he only noticed it when he wore glasses. On admission he was very drowsy at first, but examination of the blood chemistry showed no evidence that this drowsiness was due to diabetic coma. In fact he was put on diabetic orders and the urine remained sugar free after the first day in the hospital, but examination of the blood showed delayed assimilation of, and diminished tolerance for, glucose.

Lumbar puncture showed the fluid under pressure with 19 cells to the cub. m.m. and Pandy test positive.

In the other case there were more definite signs of encephalitis. The onset was more acute. He became rather suddenly ill about twelve days before admission with pains all over the body and a chilly feeling. These symptoms caused him to go to bed the next day and stay there for two days. After that he had a day when he felt well and was able to work. The next day on awakening he had double vision. This persisted for two days but without headache, though he vomited once. Following the disappearance of the diplopia he noticed dimness of vision.

On admission he seemed heavy and drowsy with slow mental coordination, but no distress. His pupils were equal, small and active to light and accommodation. There was no weakness of any extra-ocular muscle. His tongue was thinly furred and his breath heavy. His blood pressure was 138 to 94.

On examination of the nervous system nothing abnormal was found in the cranial nerves except possibly the second in that he complained of blurring of vision, but the fundi were normal. There was no paralysis or paresis of any muscle found. The knee jerks were accentuated, and abdominal reflexes diminished. The right cremasteric was greater than the left. No pathological reflexes were found and there was no retraction of the head.

The next day he was more drowsy and some ptosis was noticed in both eyes. This increased on the next day and it was noticed that the right eye could be rolled up towards the forehead, but the left eye continued to look straight forward. No other paralysis or paresis was found.

He ran a rather acute course. He was irrational a good part of the time for about a month after admission but could be roused. Delirium was distinctly occupational in character. He had almost daily incontinence of urine and at times faeces.

Almost a month after admission he had three attacks in which he had spasm of all the muscles of the body but no opisthotonus. These attacks started with a cry and frothing at the mouth. His tongue was not bitten but in one he passed urine. He remained very drowsy and stuperose after these attacks but no pathological reflexes were present.

After this he gradually improved and he left the hospital about seven weeks after admission without symptoms.

His temperature was elevated for almost a month after admission usually reaching 101 to 102, but on one occasion reaching 103.4. It ended by slow lysis.

In this case sugar first appeared in the urine 16 days after admission when he was acutely ill and it persisted off and on for about eleven days.

From the absence of previous history pointing to diabetes and the occurrence of the sugar only late in the disease while other acute symptoms were present this was regarded as a case of glycosuria due to extension of the process into the fourth ventricle, while in the first case as there was a history of symptoms suggesting previous glycosuria it was considered that that case was one of encephalitis occurring in a man predisposed to diabetes.

These cases have been followed in the metabolic clinic of the hospital since discharge and their subsequent history confirms this view as the first case shows a persistence of diminished tolerance to glucose and delayed assimilation while in the second case these have practically become normal.

These cases are offered, not as presenting anything new, but simply as cases illustrating the complexity of the problem due to the divergence of the symptoms met with in this disease on account of its apparently greatly varying severity in different cases and also to the fact that different parts of the central nervous system are called on to bear the brunt of the infection in different cases.

No specific treatment was used in any of these cases so that the results can only be ascribed to symptomatic and expectant treatment.

I have to offer my thanks to the medical staff of the hospital, especially to Drs. F. G. Finley, H. A. Lafleur and A. H. Gordon, for permission freely given to use the records in cases under their care.

The American Public Health Association announces four phases of its semi-centennial celebrations to be held in New York City, November 8-18, 1921:

(a) *The Scientific Sessions* will be held November 14-18. There will be programs of the following sections: Laboratory, Vital Statistics, Public Health Administration, Sanitary Engineering, Industrial Hygiene, Food and Drugs. There will also be special programs on Child Hygiene and Health Education and Publicity.

(b) *Health Institute*, November 8-12. The purpose will be to show health functions in actual operation, especially those which may be duplicated in other cities. In one sense the Health Institute may be considered as a school of instruction in practical health administration.

(c) *Dr. Stephen Smith*, the founder and first president of the Association, who is now in his 99th year, will be the guest of honor at a banquet to celebrate his approaching centennial and the semi-centennial of the Association.

(d) *A Historical Jubilee Volume*, "Fifty Years of Public Health," will be published about October 1. While concentrating upon the public health of the last fifty years, the book will describe the earlier beginnings of public health in an introductory way, and may, therefore, be considered a general history of public health from the earliest days to the present.

Detailed announcements, programs, and information concerning special railroad rates will appear in the *American Journal of Public Health* and the *News Letter* of the Association from time to time or may be had upon addressing the Association at 370 Seventh Avenue, New York City.

Retrospect.

ON THE CAUSE AND TREATMENT OF RICKETS.

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FOR many years the question as to the real cause of rickets, and as a sequence, the best treatment of the disease, has been in dispute. There has accumulated an abundant literature on the subject and medical opinion has veered between two main views, one that rickets is due to a defect in the diet, and the other that the main factor was defective hygiene, with occasional isolated observers blaming bacteria and the endocrine system.[1]

The recent important discovery of the vitamines with the associated explanation of the cause of beri-beri and scurvy has caused a revival of interest in the etiology of rickets and a large number of articles have been published in the last two years, based on animal experimentation, clinical observation, and chemical investigations. In spite of all this the solution of the problem seems to be still unsettled, and this disease, which is one of the commonest in the civilized world, with its far-reaching results due to the great loss of life in childhood, and to the production of deformity and weakness in later life remains a puzzle. It is curious that we can easily produce the disease in laboratory animals, and equally easily prevent or cure it, but the main cause remains unknown.

Two factors have always complicated the results: first, there is no known pathognomonic sign of the disease; although few diseases are so characteristic and so easily recognized in typical cases, scientists have never agreed on any definite criterion for doubtful cases; hence the periodic discussion on the existence or otherwise of foetal rickets and of adult rickets. Secondly, the disease seems self-limited, occurs chiefly between the ages of 6 and 15 months and all patients spontaneously improve if they survive, so that it is difficult to estimate accurately the therapeutic value of any one method of treatment.

The revival of interest in the cause of rickets is largely due to the work of Mellanby[3], who from experiments on dogs claimed to have proved that the fat-soluble vitamine, or one closely resembling it and with a similar distribution, was the paramount factor. His results were accepted by the Medical Research Committee of Great Britain[4] and widely adopted. The effect of recent studies, however, has been to negative this idea. It has been shown by many observers that various young animals fed on a diet free of the fat-soluble vitamine became emaciated and ceased growing, but at autopsy showed no rickets.[5]

Chemical studies have been many and interesting, if more or less barren of definite results. Sherman and Pappenheimer[6] showed that in rats rickets uniformly appeared in the absence of, and was uniformly prevented by the presence of phosphates in the diet. Howland and Kramer[7] have shown that the calcium content of the serum of children is remarkably constant and although during active rickets the calcium content may be slightly reduced, this seems to depend less on rickets that on a concomitant tetany. On the other hand the inorganic phosphorus of the serum is stated to be regularly reduced in active rickets, sometimes to an extreme degree. This may prove to be a valuable test for rickets and a measure of the improvement under treatment.

From the failure to establish a definite dietetic cause the hygienic theory of etiology has become more prominent. The greater prevalence of acute rickets in the winter and spring months has been acknowledged since the work of Schmorl.[8] Hess[9] argues from this that sunlight is of dominant importance in the etiology and advises treatment with ultra-violet rays. Leonard Findlay [10] of Glasgow from clinical observations claims that the chief factors in the production of the disease were overcrowding in the home and insufficient exercise in the open air. J. Lawson Dick[11] states that deficiency of food and errors in dieting will aggravate rickets, but no diet, however efficient will prevent rickets if the child is brought up under slum conditions. Paton and others [12]claim that experiments on pups show that exercise and an open-air life are the most important factors in the prevention of rickets.

Turning for a moment to the treatment of rickets we find the time honoured treatment with cod-liver oil still holds its place, although the manner of its action is still in dispute.[13] Some have ascribed its action to the vitamines present, others to the fact that cod-liver oil alters the calcium balance in such a manner that calcium will be retained in the body. The value or otherwise of the addition of phosphorus is still in debate. Alan Brown[14] and others in a recent article in this Journal argue strongly against it on clinical observations.

A recent advance of great importance in the study of the disease has been the utilization of the x-ray for observations on the long bones as a measure of the effect of various treatment.[15]

One redeeming feature in the whole controversy from the practical point of view of the average practitioner is that none of the methods of prevention or treatment of rickets as advocated are difficult, costly, or dangerous. So that probably the general practitioner will continue to advocate a mixed diet containing vitamines, with fresh air, sunlight and exercise, and with the use of cod-liver oil and perhaps phosphorus, and wait patiently for scientists to settle which of these agents is accomplishing the work.

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A SCIENTIFIC ACCOMPLISHMENT

Remarkable advances have been made in the study of blood-clotting and hemorrhage during recent years. Not only have we learned much of a practical nature concerning the "mechanism" of blood coagulation, but we have also discovered means to control even inaccessible bleeding when, as is often the case, it fails to cease spontaneously, due to defective coagulability of the blood.

The blood is kept in a fluid state in the vessels by the presence therein of antithrombin. Should the proportion of antithrombin be unduly increased and a hemorrhage occur, the blood would fail to clot. The absence or insufficiency of prothrombin or kinase, which perform an important part in the process of coagulation, would have a similar effect. Hence in the treatment of uncontrollable hemorrhage the physician needs an agent that can be depended upon to meet both of these conditions. Such a substance is Hemostatic Serum, P.D. & Co., a comparatively recent addition to the list of highly scientific remedies that have been elaborated by experts in physiologic chemistry. Hemostatic Serum neutralizes antithrombin and supplies prothrombin and kinase. Its effect is truly remarkable in the treatment of capillary hemorrhage, hemorrhage of the new-born, pulmonary hemorrhage, persistent epistaxis, bleeding from gastric and intestinal ulcers, hemorrhage following surgical operations upon the tonsils, the bones or the viscera, and so on. It is administered hypodermically or intravenously in doses of 2 to 5 cc., and the dose may be repeated at intervals of two to six hours. It is also used to prevent hemorrhage by administration prior to surgical procedure in hemophiliacs. To be prepared for any emergency the surgeon should include a package of Hemostatic Serum in his equipment, as the product keeps well and is always ready for immediate use.

Case Reports

THREE UNUSUAL ABDOMINAL TUMOURS.

H. H. McNally

Fredericton

Case 1. Sarcoma of Kidney.

Female, aged 18 months, referred by Dr. D. W. Ross who had attended at the birth and throughout the life of the patient.

The child's life had been normal during the first few months but toward the end of the first year it became worrisome and frequently seemed to be in distress. When seventeen months old a mass was noticed in the right hypochondrium which rapidly increased in size and filled the right half of the abdomen, extending to mid-line with the lower border at the level of the iliac spine. The tumour had a firm resistent feel and was only slightly tender. From x-ray examination it appeared to be attached to the ascending colon. The urine was markedly bloody at times. Bowels were constipated. The general condition was that of an anaemic child, otherwise negative.

On June 24th, 1921, the abdomen was entered by incision over the mass. The peritoneal cavity contained free fluid in small quantity and of clear colour. The ascending colon lay over the anterior surface of the tumour. The parietal peritoneum was incised lateral to the ascending colon and a line of cleavage between tumour and lateral abdominal wall was chosen. Blunt dissection permitted the tumour to be peeled from its bed and rolled medially out of the incision, exposing ureter and renal pedicle, which were ligated and divided. Bleeding was controlled by hot pack and a few points of ligature. The abdominal wall was closed in layers without drainage. Shock was extreme but was relieved by hypodermoclysis.

Time consumed in operation, twenty-three minutes.

Convalescence was rapid and at date of writing four weeks after operation, the child is apparently normal.

Dr. Crowdy of the Royal Victoria Hospital Pathological Department reports on the specimen as follows: "The specimen consists of a pole and part of the body of a small kidney, the remainder having been destroyed and replaced by a malignant growth, partly necrotic.

Microscopic sections show a characteristic tumour growth consisting of masses of deeply staining oval or slightly spindle shaped cells with little protoplasm and richly chromatic nuclei, supported by an alveolar like connective tissue stroma. The kidney tissue is markedly inflamed and shows hyaline and cellular casts.

Pathological diagnosis: Sarcoma with secondary infection of remaining kidney substance.

Case 2. Myoma of Bladder Wall.

Male, aged 54; farmer, complains of frequency of urination (10 minutes) not relieved by passage of catheter; and of great pain in lower abdomen and down the thighs; also of inability to sit with comfort or to stand erect.

Present illness dates back two years, at which time he first noticed discomfort at end of spine when riding horse-back, soon followed by inability to stand erect without pain. About a year ago there was retention of urine for which he had hospital treatment for a few weeks.

Past history is negative; no acute illness; habits good.

Present Condition: Chest normal, digestion good.

Blood Pressure: systolic 150; good pulse pressure. Slight leucocytosis; Wassermann negative. Urinalysis: Sp. gr. 1020—acid—no albumen, no sugar. Rectal examination reveals an abnormally large prostate, uniformly round.

On April 19th, 1921, suprapubic cystotomy was performed. Bladder cavity healthy and contracted. Bladder closed and peritoneal cavity opened to left of bladder where a tumour was located the size of a child's head and completely filling the pelvic cavity. The left ureter was much enlarged and crossed on the anterior surface of the tumour, it was lifted out of the wound. The iliac vessels apparently traversed the tumour.

At the pelvic brim, posteriorly and in midline, the capsule of the mass was incised and the tumour removed piece-meal. The cavity was drained by rubber tube through abdominal incision. Wound closed in three weeks. Bladder now empties normally; the bowels move freely; the patient is free from pain, can stand erect and can remain in bed throughout the night.

Total weight of tumour pieces removed, one and one-eighth pounds.

Pathological report by Dr. Crowdy, Royal Victoria Hospital: Microscopic sections show tumour tissue made up of a fairly uniform type of cell, with oval or elongated nucleus and protoplasm tending to be fibrillar. While they are evidently young cells and have the appearance and arrangement of embryonic smooth muscle they do not show any evidence of malignancy. Scattered well formed blood vessels complete the picture.

Diagnosis—Myoma. The relation to the bladder and prostate and the size of tumour would seem to indicate that it is a subserous myoma growing from bladder wall.

Case 3. Blood cyst connected with kidney.

Male, aged 26; farmer and lumberman, had from boyhood suffered from vomiting attacks, but when he first noticed enlargement of the abdomen seven years prior to coming under observation these gastric attacks had been lessening. About one year before abdomen began to increase in size he had suffered injury to the *right* loin by a falling tree.

Present Condition:—Weight 145 lbs., height 5 ft. 7 ins., of large frame, pale and somewhat thin. Haemoglobin 50%, no alteration in erythrocytes, Wassermann negative. Urinalysis: Sp. Gr. 1020; no sugar; no albumen, no casts. Slight oedema of lower extremities. Chest negative. The abdomen is much enlarged and distended and patient cannot lie on back because of discomfort and back-ache.

Abdomen opened June 21st, 1921, revealing a cystic tumour which had displaced all viscera from about the incision. Extensive adhesions prevented exploration of the abdominal cavity. Tumour was tapped and two quarts of blackish fluid removed. The thickness of the wall prevented collapse, therefore an incision was made to permit entry of hand into the tumour cavity and the removal of large masses of pultaceous material having the appearance of dirty raw cotton. Still the walls would not collapse because of the binding adhesions. By blunt and sharp dissection the tumour mass was separated from the overlying peritoneum, and from its bed posteriorly (many large vessels requiring ligature) until its attachment was recognized as being the pedicle of the *left* kidney. Tying and dividing this liberated the mass. The patient made an uneventful recovery and was discharged from hospital in three weeks.

Pathological examination: Dr. Crowdy, Royal Victoria Hospital.

The specimen as received consists of a large cystic sac, said at the time of operation to contain dark fluid which looked like bile (a specimen of this fluid received; see examination below), and a lobated mass of firm tissue, which on section shows well-formed kidney parenchyma. After extensive dissection and removal of adherent fibrous and fat tissue the following structures and relations were made out:

A large cystic sac the size of a man's head which bears a very intimate relation to the pelvis of a kidney. The contents were evidently largely fluid and had been removed, but the inner wall is still lined with a shaggy coat of fibrin and blood clot which can be easily removed. The sac is partly divided into two approximately equal parts by an incomplete septum, which shows a peripheral circular orifice 2 inches in diameter. The wall of one division of the sac is ½ inch in thickness and shows a distinct laminated structure, is very firm, tough and hyaline in appearance. The wall of the other division of the sac is only ⅛ inch thick and much more pliable and membraneous like in structure. In the course of the dissection another mass of kidney tissue approximately the size of the detached portion was disclosed in intimate relation to the wall of the thinner sac. In fact the removed piece of kidney evidently had an equally intimate relation to the sac as the bed from which it had been removed is plainly visible. If this portion of kidney is replaced in position it is so situated as to lie in the relation of one pole of the kidney to the other and moreover these two parts were connected by a thin bridge of kidney substance. The pelvis was found lying between the flattened kidney substance and the thin sac wall and is intact. The ureter had been sectioned and ligated close to the pelvis. Section of the pelvis showed that its lumen did not connect with the lumen of the cystic sac.

Examination of the fluid sent in a separate bottle gave the following results: Bile test, negative. Blood test, positive.

Microscopic Examination

Diagnosis: The dissection of the gross specimen and the microscopic picture all point to the gradual development of a haematoma beginning in very close relation to the pelvis of the kidney, gradually expanding and flattening the kidney on its surface. The vessels involved was probably one of the smaller renal branches possibly even after it had entered the kidney substance. It is impossible, of course, now, to demonstrate the actual site of rupture or the exact cause. There are two possibilities, trauma and disease-syphilis and arterio-sclerosis from the history and age are apparently excluded, as also is malignant growth because of the absence of metastasis. This leaves trauma, the most probable factor, and of which there is a definite history.

ABSORPTION THROUGH GENITO-URINARY ORGANS

The genito-urinary passages and organs are frequently the seat of the application of potent substances for either diagnostic, therapeutic or other less justifiable reasons. A knowledge of the absorptive functions of the various regions, notably the urethra, the urinary bladder, the ureter, the pelvis of the kidney, and the vagina is obviously important, not only to determine to what extent drugs may behave efficaciously in any of these localities, but also to appreciate the degree of possibility for the transfer of potent substances through the blood stream to all parts of the body. Every one realizes how profoundly absorption from the rectum may affect the organism as a whole. To what extent the genito-urinary lining membranes may facilitate the entrance of either beneficial or baneful products is not equally well understood, although the inefficiency of the urinary bladder as an organ of absorption has been emphasized frequently. Under the auspices of the Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the American Medical Association, Macht of Johns Hopkins University has investigated the behaviour of the genito-urinary organs towards a special group of drugs—local anesthetics—applied directly to various surfaces within these structures. The outcome of Macht's studies is the demonstration, alike of scientific and practical interest, that local anesthetics like cocain and its analogues are easily absorbed through the various organs of the genito-urinary tract, with the exception of the bladder. The contrast between the behaviour of this organ and the adjacent urethra is as marked as the analogous dissimilarity between the stomach and adjacent duodenal membranes. Macht urges that although the absorption of cocain, for example, through the ureter and pelvis of the kidney may seem to be chiefly of academic interest, yet in view of the modern use of such drugs as the iodids and thorium in these structures, the subject may become of practical importance. The demonstration of rapid systemic absorption of drugs from the vagina serves to reemphasize the often unsuspected dangers that lie in careless and unwarranted irrigations of its passages with potent solutions as well as by other means which may expose the surfaces to soluble products. The mention of mercuric chlorid, phenol and cresols will at once awaken relevant thoughts. Entirely new, so far as we are aware, is Macht's demonstration of rapid absorption through the prepuce. This is significant from the surgical standpoint, as local anesthetics are widely employed in application through the prepuce, so that careless or excessive use may actually lead to toxic symptoms in patients.—Editorial, *Jour. A.M.A.*, March, Vol. 76, No. 10.

Editorial

BASAL METABOLISM AND GOITRE

THE solid achievements in metabolic research and the widening field of the clinical application of metabolic methods are forcibly displayed in the series of able papers included in the Symposium on Metabolism at the June meeting at Boston of the American Medical Association. (*Jour. A.M.A. Vol. lxxvii. No. 4.*)

Probably of chief philosophical interest is the paper by Dr. Plummer, reflecting, as it does, a vast experience in the clinical field. It is a brilliant exposition of the factors which appear to be fixed truths, with here and there a mild indulgence in philosophical speculation which should prove stimulating to other workers.

Among the ascertained facts which have clearly emerged within the past year are:

(1) The effect of thyroxin administration upon the colloid goitre of adolescence. In the past these cases have fallen between two stools. On the one hand, because of a normal basal metabolism, an operation is contra-indicated; while, on the other, the medical remedies generally prescribed are innocuous; even the administration of thyroid gland by mouth having an extremely variable effect. The intravenous administration of thyroxin, however, leads to a rapid shrinking of the goitre, without producing untoward constitutional symptoms.

(2) The development of secondary hypothyroidism or a disuse atrophy, in individuals who have been subjected to prolonged starvation. These cases promptly develop signs of myxoedema on an increased diet. One has here evidently a manifestation of the law of the Conservation of Energy; an attempt on the part of the organism to adjust the total metabolism to the level of the lowered food intake. Once again thyroxin has proved a specific therapeutic agent.

(3) The necessity for defining clearly the difference between (a) the varying degrees of thyroid activity under rest and stress; (b) the varying degrees of thyroidization of the tissues due to fluctuations in the total metabolism; and (c) hyperthyroidism due to pathological conditions, such as exophthalmic goitre and toxic adenoma.

(4) The clear-cut differentiation between the three main pathological conditions met with in the thyroid, namely, (a) pure hyperthyroidism due to hyperactivity in postnatal adenomata, the removal of which invariably restores the basal metabolic rate to normal; (b) pure hypothyroidism (myxoedema); and (c) exophthalmic goitre, the status of which can not be wholly attributed to an excess of the normal thyroid secretion. In this latter connection Plummer and Boothby have thrown out the suggestion that the unusual symptoms and clinical course of exophthalmic goitre may be due to some alteration in the construction of the thyroxin molecule.

To Benedict, laboratory workers are indebted for the development and simplification of a method of indirect calorimetry, based upon oxygen consumption, which has proved most satisfactory in the investigation of thyroid conditions; while to E. F. DuBois and his associates is due the credit of having established a height-weight formula for estimating the surface area.

Of the other tests for hyperthyroidism, Boothby has been able to confirm the conclusions of Peabody, that there is no parallelism between the intensity of the epinephrin reaction and the degree of hyperthyroidism, as determined by the basal metabolic rate; further, that the so-called "positive" reaction is met in a large percentage of individuals not suffering from hyperthyroidism and even in patients with a subnormal basal metabolic rate.

Beyond the experience that it was more frequently met with in patients with hyperthyroidism than in those with hypothyroidism, Boothby has found the sugar tolerance test too variable to be of diagnostic value.

Means' graphic exposition of the results of treatment, by means of charts upon which are plotted the basal metabolic rate, pulse curve, weight variations, and partial or complete rest periods, should appeal to all readers. Among the illustrated cases, that which records the effect of over-irradiation in a case of exophthalmic goitre and the subsequent trend of the basal rate toward the myxoedemic level would appear to offer definite proof of the possibility of abolishing hyperthyroidism by means of the X-ray. If it be true that the X-ray is destined to play an important part in the treatment of hyperthyroidism, final judgment will be hastened by parallel observations as recorded in these charts.

It is timely that a word of caution should be sounded against the misuse of the various forms of metabolism apparatus now pressed upon the market. Stress should be laid upon the fact that the interpretation of results now far exceeds in complexity the actual laboratory technique, and no one should attempt to analyse or utilize the results of metabolic determinations who is not thoroughly conversant with the significance of respiratory metabolism.

ON THE DIAGNOSIS OF TUBERCULOSIS IN INFANCY

THE detection by the physician of the presence of tuberculous infection in infancy by clinical signs is always difficult until the disease appears in its advanced stages: *e.g.*, meningitis, peritonitis, or broncho-pneumonia. The incidence of tuberculosis at necropsy has been placed by Hamburger at 23 per cent. in babies one year old, and at 40 per cent. in babies two years old. Undoubtedly the incidence will vary much in different localities. In a recent paper Drs. Hunter Dunn and Cohen of Boston state that in 661 consecutive necropsies in children under two years of age performed in the Infants' Hospital in that city, 138 or 20 per cent. showed tuberculous lesions; a percentage which suggests how often even in America the presence of the disease is overlooked clinically. Hamburger divides tuberculosis into three stages, primary, secondary and tertiary. The primary stage he regards as represented by the primary lesion and the associated lymph-node involvement; the secondary stage by the lesions produced by the further invasion of the body by the tubercle bacillus; while the tertiary stage is represented by the chronic destructive lesions such as the bone and joint tuberculosis of late childhood and the phthisis of adult life. In general, diagnosis is only made when the secondary stage has been reached. In the detection of early tuberculosis infection Dunn and Cohen emphasize the importance of the following methods of examination.

First, examination of the chest for signs of enlargement of the tracheo-bronchial lymph nodes. These signs are spinal dullness obtained below the level of the second or third dorsal vertebra, and the presence of the tracheal voice below the seventh cervical vertebra, and over the upper thoracic spine when the patient whispers. This enlargement may in a few cases be due to other conditions, but is strongly suggestive of tuberculous infection. When there are signs of consolidation of the neighbouring portion of the lung, these signs may be masked and caution must be employed.

Second, making use of the Von Pirquet test Drs. Dunn and Cohen think that in infants, reactions which might be designated as suspicious and doubtful in older children should be considered as positive. In their experience the reaction was negative in a fairly large proportion of infants under two years in which the diagnosis was afterwards confirmed; a lack of reaction which they attributed to the frequency with which marked atrophy or anaemia existed and prevented its development. A positive Von Pirquet in an infant under two years of age may be regarded as confirmative of tuberculous infection with very little chance of error.

Third, the securing of a roentgenogram of the chest was the diagnostic method which eventually proved in their clinic to be the one on which the greatest reliance could be placed. Practice in interpreting the plates is essential. It is necessary to know what tuberculous lesions can be shown in a skiagram. Four lesions in the chest are characteristic of the tuberculosis of infancy. First, primary lesions in the lung; these as a rule are too small to be shown. Second, enlargement and caseation of the tracheo-bronchial lymph nodes; these according to Drs. Dunn and Cohen can be seen in the majority of roentgenograms as a definite and characteristic shadow at the hilus. The correctness of this statement, however, was seriously questioned by experienced observers at the last annual meeting of the National (American) Society for the study of Tuberculosis. Third, miliary tuberculosis in the lung which does not generally give indications in a skiagram of its presence, but may sometimes, owing to the formation of large conglomerate tubercles.

Fourth, tuberculous broncho-pneumonia, which invariably gives a shadow recognizable as pulmonary consolidation; but broncho-pneumonia may not always be of a tuberculous origin.

A positive Von Pirquet reaction is the only evidence available pointing to a primary intestinal infection, and the early diagnosis of this stage of the disease cannot be made unless either the Von Pirquet is positive or the physician finds tubercle bacilli in the stools; but primary intestinal tuberculosis is rare in comparison with the primary focus in the lung. If the Von Pirquet is positive, or even suspicious and if the roentgenogram shows a shadow of tracheo-bronchial lymph-node enlargement, a diagnosis of tuberculosis primary in the lung may be made with a fair degree of certainty. If the sole evidence is a positive or suspicious D'Espine's sign with spinal dullness, a probable diagnosis may be cautiously made. In regard to the prognosis of infantile tuberculosis Drs. Dunn and Cohen consider that the disease may be arrested if the patient presents no evidence that the disease has passed beyond the primary stage, but in no case is the outlook good owing to the tendency to develop fatal secondary forms in the early years of life.

EFFECT OF TOBACCO SMOKING ON THE NERVOUS SYSTEM

AT the last meeting of the American Society for Pharmacology and Experimental Therapeutics, W. L. Mendenhall read a paper (Jour. Pharmacol. and Exp. Therap., Vol.. XVII, No. 4, p. 333) on the effects of tobacco on the sensory thresholds of smokers and non-smokers, detailing the results of a series of observations carried out at Dartmouth Medical School. The normal threshold of the person tested was first determined by the Martin method of quantitative faradic stimulation, and after twenty or thirty minutes smoking the threshold was again measured. The observations demonstrated that the effect of smoking as shown by variation in the threshold was conditional upon the state of the sensory mechanism of the individual at the time of observation. The average normal threshold of both smokers and non-smokers was about 180 B. units. If the individual's threshold was at or near normal, smoking effected little change. If his threshold was low, indicating high irritability (nervousness) then smoking raised the threshold and lowered irritability. If the individual's threshold was high, indicating a depressed sensory mechanism then smoking had a stimulating effect. The depressant action of smoking, however, was more marked than its stimulating effects. Control experiments were made in which the subject rested instead of smoking. The effect of resting upon the sensory threshold was to vary it in the same way as did smoking. If the subject was nervous or irritable (low threshold) resting tended to raise the threshold and bring it back toward the normal; on the other hand if the subject was depressed (high threshold) then rest tended to strengthen and to restore the normal. The effects appeared to be similar, but smoking differed from rest in that it was more effective for the time. The stimulating action of smoking when one is depressed and the soothing effect when one feels nervous or irritable is generally acknowledged and accounts for the widespread use of tobacco. Many of our readers will be glad to have this demonstration of the usefulness of the weed, a fact which up to the present has been doubted by many pharmacologists. Cushing places the psychical factor and rhythmical movement in smoking as important, and calls attention to the fact that few care to smoke in the dark.

ON THE VALUE OF CINCHOPHEN AND NEO-CINCHOPHEN AND NOVASPIRIN IN RHEUMATIC FEVER

CINCHOPHEN, and neo-cinchophen were introduced to the profession some years ago by a German firm, under the names of Atophan and Novatophan, and advertised as superior to the salicylates in the treatment of rheumatic fever, and as quite free from any toxic action on the heart, kidneys and nervous system. The action of these drugs has been recently tested by Prof. Hanzlik and his assistants in the Pharmacological Laboratory of the Western Reserve University, (Jour. Amer. Med. Assoc., June 18, 1921, Vol. 76, No. 26.) Chemically cinchophen is phenyl-cinchoninic acid, and neo-cinchophen is the ethyl ester of its methyl derivative. Cinchophen is the more soluble of the two; and therefore more active but also more irritating and toxic. The result of Hanzlik's experiments do not warrant the statement that cinchophen in the dosage advocated offers any superiority over sodium salicylate. The action of both appears to be similar, and about equal in therapeutic value. Both may bring on symptoms of salicylism and renál irritation. Cinchophen may give rise to more epigastric pain than the corresponding dose of sodium salicylate. This pain was not so manifest after the use of neo-cinchophen in similar doses, but the latter appears to be distinctly less efficient than either sodium salicylate or cinchophen in the treatment of acute rheumatic fever. Novaspirin, another drug recommended for the same purpose, while giving rise to no timnitus aurium or cardiac depression in the patients treated by it, was found by Hanzlik to be much weaker in therapeutic effects; a result due to the inadequate liberation of salicyl from novaspirin in the system.

ON THE VALUE OF IRON IN ANAEMIAS

IRON has been employed empirically in the treatment of anaemia for many centuries even before the element was known to be an important constituent of the red blood corpuscles. Its value has been frequently questioned. Its absorption in the inorganic state was at first denied. When proof of absorption in the duodenum was afforded by pharmacologists, its usefulness in supplying losses in the haemoglobin content way was questioned and from time to time its action has been explained in various ways. It is admitted by all that ordinary human dietaries contain sufficient of this element for the very small wastage that takes place in the body. Nevertheless no form of ailment is more frequently encountered by physicians than that in which for one reason or another the haemoglobin content is deficient and nutrition fails; in such conditions the value of the administration of iron in some of its simpler preparations has been thought to have been attested by the results of much clinical experience. The statements, therefore, made recently by Whipple and Robscheit as the result of careful research carried on in the George Williams Hooper Foundation for Medical Research connected with the University of California Medical School will come as a surprise to both physicians and pharmacologists. (Arch. Int. Med., May, 1921, pp. 591).

These investigators state that the administration of iron in the form of Blaud's pills, citrate of iron, or of ovoferrin in cases of simple anaemia under carefully controlled conditions is almost inert or at least much less potent than simple diet factors. Their careful experiments give little support to the time honoured custom of administering iron and arsenic to supplement a deficiency of haemoglobin in the system. No special drug tested by them could compare with a carefully selected diet in stimulating the rapid regeneration of the haemoglobin content, especially in the anaemic conditions induced by simple haemorrhage.

These results although to some extent destructive of long-held views, have the definite constructive value of teaching a wholesome respect for the value of a correct dietary in replacing wastages that may take place in the blood. While we believe that the employment of iron therapy in many forms of anaemia will not be rashly discarded by physicians as *useless*, the great importance of a selected diet and of a healthy digestive tract, in the treatment of anaemias, and other conditions in which some constituents of the blood is assumed to be in deficient amount must not be overlooked.

DIFFERENCE BETWEEN RECTAL AND COLON INJECTIONS

THAT drugs are not absorbed with equal rapidity from the different parts of the alimentary tract has been long recognized; furthermore absorption rate may profoundly influence pharmacological action. Both oral and rectal mucous surfaces often lend themselves to more rapid absorption than the stomach; advantage of this fact is taken in the administration of nitroglycerin under the tongue or of hypnotics, etc., by rectum.

Interesting differences between the effects of rectal and high colonic administration of epinephrin have recently been pointed out by Barbour and Rapoport. Rabbits were found to exhibit the greater blood pressure effect after injections by rectum; on the other hand high colonic administration enhanced the glycosuric and accompanying diuretic effects. (See Barbour, H.G., and Rapoport, F. H., Journ. Amer. Med. Assoc., 1921, 76, 492.)

So far as venous drainage is concerned the differences are readily explained by the anatomical conditions. Rectal venous blood is conveyed directly to the vena cava and the pressor effect of epinephrin is favoured. The portal system, however, drains the colon, thus promoting the mobilization of glycogen from the liver, also delaying the ingress of epinephrin to the circulation ("detoxifying" effect.)

Various clinical possibilities are suggested by the above-mentioned pharmacological investigation. Not only does it call attention to the effectiveness of rectal administration for obtaining a sustained action of epinephrin upon the circulation, but it also indicates that when the lower bowl is chosen as a portal of entry for drugs much may depend upon whether colon or rectum be selected.

THOSE of our readers who attended the annual meeting at Halifax will remember that it was unanimously decided that beginning January 1922 the annual fee for membership in the Association should be increased to $10.00. It has always appeared to the writer that our members have regarded the annual fee to the Association as a subscription to the Journal. The fact is that the present fee of $5.00 hardly pays for the printing of the Journal. We wish it to be understood in future that the increased fee of $10.00, which includes the Journal, is really a fee for membership in the Association, and that our members will receive full value under the new plan of re-organization outlined in the report of the Committee which appeared in our September issue. We hope that our members will respond to our appeal and accept promptly the draft for $10.00 which will be presented to them in January.

J. W. Scane,
Secretary-Treasurer.

Men and Books

THE CENTENNIAL OF RUDOLF VIRCHOW, 1821-1921

By Horst Oertel, M.D.

Professor of Pathology, McGill University

IT is a curious coincidence that the birth of the founder of modern pathology and of McGill University fall in the same year, and that one of the days of McGill's centennial celebration and the birthday of Virchow are the same (13th October). Thus, McGill University has witnessed the whole rise of scientific medicine of the nineteenth century. When it was founded cellular pathology, bacteriology, the laws of heredity, the graphic methods of physiology, experimental psychology, antisepsis, anaesthesia, to say nothing of the super-structures in practical medicine and surgery, were, in the modern sense, unknown. No other century has ever witnessed such a tremendous development in all fields of science. It was productive not only in great individual discoveries, but in the development of fundamental scientific principles. It is in regard to the latter that Virchow takes the front rank. He accomplished a fundamental change in scientific attitude in medicine and even in biology. His merit does not shine with the isolated brilliancy of particular discoveries, it does not lie in an enrichment of one or another field in science, but it is much greater. It is the creation, by two great steps: first, of the corner stone upon which all present conceptions in medicine and biology rest, and second, of a method of objective investigation and reasoning which brought forth the whole structure of modern medicine in all its fields. For whether an investigator deals to-day with chemical, physical, or morphological problems of life, he follows in Virchow's footsteps.

In order to appreciate the greatness of these two accomplishments and to trace their origin, it becomes necessary to sketch briefly the historic and contemporary background of Virchow's time.

It may seem strange to-day that up to the middle of the last century medicine and biology absolutely lacked a uniform scientific standpoint and method of approach.

A curious phenomenon is here to be observed. While the rise of natural sciences during the seventeenth and especially the eighteenth century had profoundly influenced the spirit of the time and philosophical ideas, and it had, in combination with humanistic influences, broken down the old fossilized scholasticism, the natural sciences themselves still remained strongly bound to old metaphysical ideas and scholastic methods. Thus, although individual efforts bore fruit here and there and augmented knowledge, these efforts remained as ununited links of a chain and lacked fundament. Nowhere was this lack of scientific basis and cohesion more noticeable and disastrous than in biology and medicine. For, although a great philosopher, Kant, had already laid down the principles of scientific judgment and critique, the workers in the sciences themselves remained strangely unconcerned. Thus it happened that when in the year 1839 (the year in which Virchow matriculated as a medical student in Berlin) Schwann published his great work on the cell structure of animals and showed that the ovum was a cell, the significance and meaning of these observations remained hidden, even to him. And Remak, who in 1852, had reached the threshold of the importance of cell structure and life in the conclusion that all embryonic cells originated from other cells, did not cross this threshold.

Cells were recognized, but only as building material.

Virchow's scientific career had at that time already made itself felt, for he had clearly laid down his program and method of research. This is to be noted in his first investigation on "Phlebitis," which he, at Froriep's instigation, had begun in 1844.

Two great principles guided him:

First, knowledge of processes of disease must have an objective, anatomical basis.

Second, conclusions of the nature of diseases must be based on objective experience and strictly according to the laws of cause and sequence.

Although he did not actually formulate these principles in these words, they permeate all his works from beginning to end. When he read his paper on "Inflammation of the Veins" on the second of August, 1845, the occasion of the fiftieth anniversary of the foundation of the Academy of Military Surgeons in Berlin, he precipitated general indignation and resentment. Any such mechanistic conception of disease and life as Virchow advanced seemed to almost everyone heresy and impossible. Busch, the director of the Obstretical Clinic exclaimed, "Well, well, did you hear that? He tells us that we know nothing at all." Few only saw its importance and the dawn of greater things.

Thus also, Rokitansky's great work on Pathological Anatomy (1841-1846) as excellent and accurate as it was in the details of histological changes, still clung tenaciously to the old metaphysical views of the humoral nature of disease. He still traced diseases to faulty mixtures of the blood. "Dyscrases" produced, in turn, diseases of which the histological changes were only local expressions.

Gradually Virchow's own views had matured. Not only had his histological examination of normal and diseased tissues convinced him of the functional importance of cells as regards life, but his studies of the connective tissues led him to the most important conclusion that all cells come from pre-existing cells. The latter point had remained obscure even to Schwann. It was then generally held that cells originated from an unorganized germinal substance, the blastema, and that out of this was differentiated first a nucleus and later, by diffusion through the nuclear membrane, the cell protoplasm. Thus, the intercellular substance and exuded fibrin were regarded as mother substances of cells and all inflammatory and even tumor cells were traced to vital differentiation of such, at first unorganized, blastemas.

In 1858 Virchow's ideas had sufficiently matured in him to present them in co-ordinated, connected form in a series of twenty, now justly famous, lectures to an audience of physicians under the title "Cellular Pathology, as based upon physiological and pathological histology."

Four great principles were here advanced by him of which he formulated concisely the first two, while the other two follow of course.

First, the cell is the unit of life, that is, "Every animal presents itself as a sum of vital unities, every one of which manifests all characteristics of life. These are arranged in cell territories and united by an intercellular substance. But the latter is not destined to form new cells, as Schwann and others would have it, but dependent in a certain definite manner upon the cell."

Second, all cells develop from pre-existing cells. (Omnis cellula e cellula).

Third, diseases are pathological cell changes and disturbed cell relations.

Fourth, the anatomical changes thus produced constitute the disease.

Herewith Virchow discarded all speculative fantastic systems in medicine, and incidentally in biology, and created the modern objective study of disease and the anatomical (visual) conception of diseased processes as cell changes.

Whatever scientific thought has been produced since Virchow has only enlarged, never contradicted these principles. Their establishment remains Virchow's greatest and lasting contribution to science, but not the only one. There is in the whole domain of pathology no field which he has not enriched by his own work and especially by stimulating ideas, and it is interesting to note that some of his views which were discarded at one time are revived to-day, to shine with brighter light. Thus, his ideas on increased functional activity under inflammatory irritants and the existence of formative stimuli have received confirmation by modern experimental methods.

It need not be concealed that he fell into errors which later research corrected, his greatest being perhaps his idea on cancer which he traced to the connective tissues, an idea which, under his authority, continued until Waldeyer and Thiersch properly established cancer as an epithelial growth, in the early eighties of the last century. His reluctance in recognizing bacteriology as a part of pathology continued to his end and is responsible for the strict separation of pathology and bacteriology in Germany to the present day. Thus, also, he had little use for advances in histological technique and in the new staining methods, in fact for everything that made investigation easy and was a short circuit to knowledge. And he undoubtedly went too far in his objections to them.

It would be an error to refer to Virchow as a morphologist. It is quite true that sound objective anatomical evidence remained for him the foundation of all biological knowledge, but his understanding and interpretations were always made in the functional, dynamic sense. The establishment of a pathological physiology, based of course on and in conformity with the facts of anatomical experience, was foremost on his mind and he was anxious to obtain experimental evidence for the elucidation of individual problems. But he knew, as well as we know it to-day, the limitations of the experimental method, knew that we never can bring about experimentally all phases and circumstances of a disease, and that the "natural experiment," that is the diseased body, remains after all the main and most reliable source of information.

Moreover, he had the sound judgment that nothing is worse for a scientist than to split and dissipate his energies amongst many things, but that he must preserve his resources for those partitions of science which need them most and through which he can most accomplish.

Here Virchow stands out as a great teacher and leader of human thought. No other scientist has ever brought about greater, more general, far-reaching, academic reforms. He organized, one might say unconsciously, pathological and medical teaching of the whole world. He built the first pathological institute in which all departments of pathological research were properly housed, united and co-ordinated. He insisted upon it as an academic university institute, on hospital grounds; and he had the satisfaction to see that every university of note in the world followed. His courses were duplicated everywhere. One of the first things Osler did when he returned from Berlin to Montreal was to adopt Virchow's teaching methods and Osler never grew tired of emphasizing their importance.

Virchow lifted the department of pathology which until his time had simply been the appendix and handmaiden of the wards to the centre of hospital activity and university life, around which the various departments of the medical faculty are grouped and from which they radiate. He thus made possible the development of modern scientific medicine. The value of a pathological institute to him lay not in the work which it did for the hospital wards, but in the training and scientific attitude which it developed in hospital and medical faculty, and in forming the essential bridge between anatomy and physiology on one side, and the clinical branches on the other.

Virchow was an interesting personality, but to many not attractive. Coming from an old Pommeranian family, the father a hard-headed, conservative, old-fashioned, small farmer and city chamberlain in Schivelbein, the more elastic broader mind of the son came into early and frequent conflicts with him, chiefly on account of his freer ideas, political views and opposition to constituted authority. These also brought him into greater trouble in the revolutionary Berlin elections of 1849. Virchow at that time was already prosector in the "Charité" Hospital and also had the privilege of board and lodging. He had carried on an active campaign and election propaganda in the Charité Hospital, a government institution, against the Government. Thereupon, the Minister of Public Education, under a very natural pressure by Government and certain political factions relieved Virchow of his government position in the Charité. This, however, precipitated such a protest from students, physicians and others who had academic freedom at heart, that the Minister of Education rescinded the order of dismissal and only requested Virchow to move into different quarters where his political influence on officials and employees of the Charité need not give rise to apprehension. The Ministry also, apparently as a sort of compensation, granted him one hundred and fifty dollars for scientific research. But in the meantime Virchow received a call to Würzburg. Even before Virchow's open political difficulties in Berlin, negotiations had been in progress between the medical faculty of Würzburg and the Bavarian Government to extend a call to Virchow. The chief promoter of this scheme was Rinecker, to whose wise judgment the medical faculty in that university already owed the selection of Kiwisch, in gynaecology, and Kölliker, in anatomy. But the Bavarian Government at first hesitated on account of strong clerical and political opposition to Virchow, but finally consented and Virchow was officially called. Thereupon he made certain demands in Berlin which, as the Minister of Education stated at that time, could not be met for financial and other reasons and Virchow accepted Würzburg. I have related this story in some detail, because it is often inaccurately quoted. This happened in 1849. In 1856 the University of Berlin recalled him on his own terms. It is only fair to acknowledge that no other Government ever subordinated its own feelings and wishes in greater measure to academic autonomy and demands than the Prussian Government did in recalling Virchow to the University of Berlin. Here he remained to his death in 1902.

Like all great men Virchow was a curious psychic mixture, in some points paradox. He lacked the "milk of human kindness" and that encouragement and kind manner towards others which we like to see in our own great men, so beautifully examplified by Osler. He was a hard task-master, often, so many thought, too brusque and provocative. As he set the highest standard for himself, so he expected it in others. He despised amateurish meddling and dilettantic display and condemned them with strong words. The scientific "climber" found no friend in him. He was at times perhaps unnecessarily severe and direct in criticism and students have told me that in examinations he treated them brutally. He had, at any rate, the reputation of being the hardest examiner "to get by." Even in lectures and demonstrations his sarcasm was often cutting. He showed at times an almost insulting attitude to others in regard to his own importance and that of his subject. He would come and go when he pleased, commence and finish lectures when he pleased, and was passionately annoyed if any one took exception to his arbitrary ways. The story is told that there were so many complaints about Virchow to the Minister of Education that that official had a special cabinet built for them in the Ministry. This is an apparent exaggeration, but nevertheless reflects the general feeling regarding Virchow. Even his assistants had no easy time with him and he was slow in promoting them. Having once made up his mind to something he remained obstinate. He was not at all pleased with the development of modern bacteriology and especially immunology. The chemical explanation of vital processes smacked to him too much of the old humoral pathology. Strange enough some of his objections are supported to-day by recent physical and colloidal knowledge of cell activities. Moreover, the fantastic imagination of some of the experimentalists aroused his wrath. It seemed to him a return to what he had so successfully fought against in the establishment of cellular pathology and objective observation.

But all of Virchow's faults were really parts of his virtues. He identified himself with his subject, and virtues and faults both sprang out of this identification. He had, like all prophets, supreme confidence in himself and his mission and the objectionable exaggerations of his personal character were due to it. It is doubtful whether he ever could have accomplished what he did had be been softer, more easily adaptable, malleable and compromising. He saw a tremendous as yet unshaped task before him, and like the sculptor, he wielded mallet and chisel with strong hands to give it serviceable form.

With it all he was just and fair and no one has ever had greater regard for duty and responsibility. At the heated discussion on the value of diphtheria antitoxine in the Berlin Medical Society, shortly after it was introduced in 1894, I heard him discuss the question with eminent fairness and impartiality.

In stature Virchow was small and appeared, at least in older age, as I remember him, rather delicate. But his constitution was rugged. His face was typical of the scholar, his eyes penetrating and active, his speech direct, sometimes hesitating, but always sincere without any effort to conceal his ideas. He loathed hypocrisy and speech was not given him to conceal his thoughts.

Like most intellectual men he lived well. He himself tells us that in his early days in the Charité he commenced the day at 8 o'clock in the morning with meat and beer, followed by an equally abundant lunch, "without these sustaining matters the work of the day would have been too exacting." At the dinner he gave in honor of receiving his doctor's degree he and his guests finished a case of wine, sent by his father, followed it by champagne and punch and reached home at 3 o'clock. Next morning he was the guest of his colleagues in the Charité at an equally good "breakfast." At one time he remarked "I have learned more in conversation over beer and wine than sitting at my desk."

He was capable of fine emotions. For Pasteur he maintained throughout a high regard and he loved England, the English and the Scotch and much enjoyed his English visits. The same, sober, objective mind of the British scientists appealed to him tremendously and was kin to his own mind and reason. For Lister he had developed during a long friendship not only high admiration, but a genuine affection and at a small private dinner given by Virchow he paid such a tribute to Lister and in such an affecting way that the latter could with difficulty only restrain his emotion.

Virchow's name and work are imperishable. The tribute which Welch paid to him at his death may well be repeated here:

> "Important as was the reformatory influence upon medicine of the discoveries and work of the few leaders whose names are worthy to be placed beside his, such as Galen, Vesalius, Harvey, Hunter, and Pasteur, it may be safely said that the establishment by Virchow of the principles of cellular pathology marked the greatest advance which scientific medicine had made since its beginning."

Virchow's grand impressive public funeral, unique in pomp and splendour in academic annals, in which his Emperor, the State, the City and the World paid him homage, was that of a valiant hero, who had died fatigued by victories, unconquered!

The Association

REPORT OF THE COMMITTEE ON PUBLIC HEALTH AND HYGIENE

The undersigned, your Committee on Public Health, respectfully submit the following proposed resolutions for your consideration:—

1. That the Association would, again, draw the attention of the profession throughout Canada, to the very great necessity of reporting all cases of Venereal Diseases of which its various members become cognizant, to the Provincial Health Authorities concerned, in accordance with the several laws and regulations laid down for that purpose by the said Health Authorities.

2. That this Association would respectfully point out to the Federal Department of Health the unwarranted delay and the unnecessary expense entailed in the quarantine of passengers and other occupants of vessels, arriving at Canadian Quarantine Stations, who have been in contact with Small-pox, beyond the time necessary to prove beyond reasonable doubt the immunity to Small-pox of said passengers and other said occupants, as ascertained by (1) a prior attack of the disease, (2) by recent and successful vaccination, or (3) by successful vaccination performed at or about the time of the occurrence of contact.

This Association would respectfully submit that said passengers and others upon said proof of such immunity being had, be forthwith released from quarantine after a thorough disinfection of their persons and personal belongings.

3. That this Association desires to place on record its disapprobation of the employment by either public school, or health authorities of persons other than regularly qualified medical practitioners as Medical Inspectors of Schools. This Association believes that such practice is defeating its object and affords a false security by introducing an element of incompetency, likely to bring Medical School Inspection into disrepute and entail, at times, serious consequences.

(Sgd.) GEO. MELVIN, *Chairman.*
C. J. HASTINGS.
A. J. DOUGLAS.
Committee on Public Health.

Fredericton, N.B.,
May 6th, 1921.

RESOLUTIONS ADOPTED AT GENERAL SESSIONS, HALIFAX, JULY, 1921.

On Insurance Fees.

Resolved. "That whereas the fees for medical insurance examinations vary from one province to another, and are recognized as too low in some provinces ($4.00 and $3.00 paid by some Insurance Companies), *Whereas:* The New Brunswick Medical Society at its last annual meeting studied the question of insurance fees and expressed the opinion that the establishing of uniform fees for insurance examinations throughout the Dominion should be referred to the Canadian Medical Association for immediate action.

Be it resolved that: This Association considers it desirable that uniform and adequate fees be paid by the Insurance Companies to their medical examiners throughout the Dominion and that the General Secretary be instructed to take the matter up immediately with the Association of Life Insurance Underwriters."

On the Standardization of Hospitals.

Resolved. "That the Canadian Medical Association, at its Annual Meeting at Halifax desires to express its unqualified approval of the plan of Standardization of the Hospitals of the Dominion as being now undertaken under the supervision of Dr. M. T. MacEachern of Vancouver."

The Association also approves of the appointment by Dr. MacEachern of a special agent for this purpose.

On the Formation of a Canadian College of Physicians and Surgeons.

Resolved. "That whereas, owing to the lamented death of the late Dr. McCallum of London, Ontario, Chairman of the Committee on the formation of a Canadian College of Physicians and Surgeons, the work of the Committee has not progressed sufficiently to make a comprehensive report at this meeting of the Canadian Medical Association at Halifax:—be it resolved that the Committee be continued and requested to make a report at the next general meeting of the Association; and that the Committee be enlarged to include a representative from each Province of the Dominion."

On Patent and Proprietary Medicines.

Resolved. "That in the opinion of this Association the claims in regard to many of the Patent and Proprietary Medicines on the market are unjustifiable, and that they constitute a danger to the public. It would therefore urge upon the Dominion Government that it make use of the Proprietary or Patent Medicine Act as it at present stands, and under Section 7 (1), (e) and (f), proceed against those manufacturers or dealers, who represent a remedy as a cure for any disease, or who place on the wrapper or label, or in any advertisement of the article, any false, misleading or exaggerated claims in regard to the article."

On the Re-Organization of the Canadian Army Medical Corps.

Resolved. "That whereas as the Association does not approve of the findings of the Committee on the Re-Organization of the Canadian Army Medical Corps, it is moved that the said Committee be disbanded and the matter closed."

On the Museum Exhibit.

Resolved. "That the warm appreciation and sincere thanks of the Canadian Medical Association be conveyed to the Canadian Government and to the Universities of Toronto, Queen's, McGill, and Dalhousie, for the splendid and representative exhibits from the Canadian Army Medical Museum, and the Pathological Departments of the said Universities, which have contributed so greatly to the interest and enjoyment of this meeting, and have served to enhance its scientific status."

Resolved also. "That in view of the educational value of the material from the Canadian Army Medical Museum, and of the fact that these meetings are the only means by which it can be brought to the attention of the medical profession of Canada at the present time, it be respectfully suggested to the Canadian Government that similar exhibits be presented at future meetings of this Association."

Resolved further. "That a copy of this resolution be sent to the Director General of Medical Services."

Notices of Motion.

Dr. Argue gave notice that at the next Annual Meeting he would move that the By-Laws of the Association be amended as follows:—

Chapter VII., Section 6 (The Council):—

After the word "Committee" Line 3, to insert the words:—"To be known as the Executive Committee and which shall consist of (a) Seven members appointed by the Council from amongst its members and (b) Two representatives from each province to be appointed by the Provincial Association.

Also Chapter VIII., Section 1 (The Executive Committee), the word "THREE" at the beginning of the last sentence of the section to be altered to read "FOUR."

Dr. George Bingham gave notice that at the next Annual Meeting he would move:—

"That when, and wherever the Canadian Medical Association meets in each of the Provinces, the Meeting shall be held in conjunction with the Provincial organization, and that the local organization shall have control of the arrangements and as far as possible, the preparation of the Scientific Programme."

News Items

THE ONTARIO MEDICAL ASSOCIATION.

(Continued from last issue)

The Business Programme of the O.M.A. meeting at Niagara was scheduled as follows:

The important details of this programme will be reported in full, as the Editorial Board feel that it is to the interest of every practitioner to have all the procedures of these active committees put clearly before them; it is most apparent that these various committees are rapidly getting in touch with matters which vitally concern the profession in Ontario.

Tuesday, May 31, 1921.

11.00 a.m. Meeting of the Executive Committee.
11.30 a.m. Meeting of the Committee on General Purposes.
2.00 p.m. Meeting of Committee on General Purposes.
6.30 p.m. Round Table Dinner and Discussion.

Wednesday, June 1, 1921.

9.00 a.m. General Business Session of the Association.

Thursday, June 2, 1921.

11.30 a.m. General Business Session of the Association.
11.45 a.m. Meeting of Committee on General Purposes.

Friday, June 3, 1921.

11.30 a.m. General Business Session of the Association.

Meeting of the Committee on General Purposes held at the Clifton House, Niagara Falls, on Tuesday, May 31st, 1921, at 11.30 a.m.

Upon calling the meeting to order, the President, Dr. Mullin, announced to the Committee the acceptance by the Directors of the Articles of Incorporation, and then turned the meeting over to the Vice-President, Dr. Farley, as Chairman of the Committee on General Purposes.

Dr. Farley, in assuming the chair, in a few chosen words, welcomed the members of the Committee to the meeting. Twenty-seven members responded to the roll-call. Several communications were then received, and by resolution moved by Dr. Elliott, seconded by Dr. Boyce, were referred to the respective Committees.

Moved by Dr. Elliott and seconded by Dr. Cameron:

That the income tax matter be referred to a special sub-committee (Drs. Henderson, Young and Cruickshank), and that this Committee be asked to report through the Committee on General Purposes to the general meeting of the Association. Carried.

The sub-committee on Dominion Taxation begs leave to report and recommend as follows:

Whereas the sub-committee has ascertained that in various places and in various cases in this Province exemption from taxation has been refused for the following items of necessary business expense, namely:

(1) Membership dues in scientific and medical societies and the expenses incurred in attending the annual meetings of the same.

(2) Subscription to scientific and medical periodicals;

(3) Expense of attendance on post graduate courses of University instruction;

Therefore the Ontario Medical Association resolves to instruct the incoming Executive to make representations to the Minister of Finance that these are genuine items of business expense, and should be exempt from taxation.

Moved by Dr. Henderson and seconded by Dr. Farley:

That this report be accepted, and that a copy be forwarded to the Canadian Medical Association. Carried.

Moved by Dr. Mullin and seconded by Dr. Cameron:

That the telegram of greetings from the Ontario Dental Association be received and passed on to the general meeting for the necessary action. Carried.

The meeting adjourned at 12.45 p.m. for luncheon.

Reconvened meeting of the Committee on General Purposes on Tuesday, May 31st, 1921, in the Clifton Hotel at 2.00 p.m., with the

Chairman, Dr. Farley, in the chair, and with forty-two members of the Committee present.

Dr. Mullin introduced Dr. MacEachern of Vancouver to the meeting, and by unanimous consent of all present, Dr. McEachern was extended all the courtesies of the Committee.

Moved by Dr. Secord and seconded by Dr. Sinclair:

That the minutes of the previous meetings of the Committee on General Purposes for the past year, be taken as read. Carried.

Moved by Dr. Mullin and seconded by Dr. Morgan:

That the following applications for affiliations with the Ontario Medical Association be received and temporarily accepted pending the report back to the Committee on General Purposes of the following Sub-committee of this Committee on General Purposes. Carried.

Bruce County Medical Society.
Haliburton County Medical Association.
Lanark County Medical Society.
Ontario County Medical Association.
Norfolk County Medical Society.
North Bay Medical Society.
Parry Sound Medical Association.
Toronto East Medical Association.

The Chair then named the following subcommittee: Drs. Argue, Cameron, Longmore, Secord and Cruickshank.

Moved by Dr. Mullin and seconded by Dr. Henderson:

That the Nominating Committee be as provided for in the by-laws, and that each County Society represented at this meeting, appoint its respective delegates to the nominating Committee. Carried.

Moved by Dr. Bruce and seconded by Dr. Noble:

That the Nominating Committee be convened at six p.m. on this date. Carried.

Moved by Dr. Henderson and seconded by Dr. McQuade:

That the Committee receive the Executive report as printed, and go into a Committee of the Whole to discuss same, with Dr. Bruce being elected Chairman of the Committee of the Whole. Carried.

Dr. Bruce then took the chair. The Executive report was read clause by clause by Dr. Secord, the following action being taken on certain of the clauses.

Moved by Dr. Mullin and seconded by Dr. Noble:

That the Committee on General Purposes recommend to the Association the advisability of Counsellor District meetings being held as regular fixtures of our Association. Carried.

Moved by Dr. Mullin and seconded by Dr. Oliver:

That the tabulated tariff as printed, be referred to each County Society for report, and that, in case the Secretary does not hear from the County Societies with further reference to the matter, the respective Counsellors be so advised. Carried.

Moved by Dr. MacDonald and seconded by Dr. Argue:

That the incoming Board of Directors be advised to continue negotiations with the Workmen's Compensation Board, and further that the Directors be instructed to request the Cabinet to appoint a representative of the Ontario Medical Association as a member of the Workmen's Compensation Board. Carried.

Moved by Dr. Mullin and seconded by Dr. Anderson:

That the report of the Joint Advisory Committee be received and approved. Carried.

REPORT OF JOINT ADVISORY COMMITTEE

Toronto, May 26th, 1921.

Mr. President and Gentlemen:

After the first meeting of the Advisory Committee, the Chairman was instructed to prepare a statement for the Press, which statement was forwarded to each Member of the Committee.

An endeavour was made by letter to the Premier, to get an appointment with the Premier and the Minister of Education for the purpose of ascertaining whether or not medical legislation would be introduced at the next session. This letter was written on April 15th. No reply was received for two weeks, a telephone communication at this time revealing the fact that the Session was taking up so much time that it would be impossible to grant an appointment until the House closed. The Session finished, the Minister of Education was unable to grant an appointment for over two weeks. He notified the Committee, however, that he and the Premier would receive the Committee on Friday, the 20th, at 2 o'clock in the afternoon.

It being impossible to call the Committee together by mail notice each of the members was communicated with by telephone. All approved of the meeting and the object. Dr. Cameron, Dr. Burt and Dr. Argue were not able to be present. The President of the Ontario Medical Association was communicated with and he approved of the meeting and hoped that something would be accomplished thereby. Several names were suggested as substitutes by the members of the Committee, some of whom did not see their way clear to act. However, on Friday the Committee met the Premier and the Minister of Education in the Parliament Buildings. There were present Dr. E. E. King, Chairman, Drs. F. A. Clarkson, G. M. Brodie, and T. C. Routley, Secretary.

The Chairman in presenting the matter to the Premier said that "We are the Advisory Committee appointed by the Executive Committee of the College of Physicians and Surgeons of Ontario, and the Ontario Medical Association. We are desirous of ascertaining the possibility or probability of the Government introducing medical legislation at the next Session of the House.

"This Committee has to report to the Ontario Medical Association which meets at Niagara on the 31st inst. and 1st, 2nd and 3rd of June, and to the Medical Council which meets in the latter part of June. Neither body meets again for a year."

He drew the attention of the Premier to the decision of the Court of Appeal in 1906 in which the definition of the practice of medicine as defined in Medical Act of 1879 was interpreted to mean the administration of drugs; that since that time the bars had practically been down and Ontario had been overrun by irregular practitioners; that the public had suffered therefrom, and that the Medical Act, through its administrators, the College of Physicians and Surgeons, did not have the power to stop them; also that the Medical Council for many years had endeavored to have this matter corrected and the Medical Act amended with the definition of the practice of Medicine brought up to date to cover the situation; he pointed out that the Council had been refused permission to prosecute irregulars under the Act, and the definite promise made by the late Sir James Whitney that the Medical Act would be amended, and that he would appoint a Commission and investigate the whole matter. The Chairman also pointed out that such Commission had been appointed and had presented its report; that the Commissioners' report had been approved by both the College of Physicians and Surgeons and the Ontario Medical Association, and also that neither the Whitney Government, the Hearst Government nor the present Government had ever sustained the Hodgin's Report nor accepted its findings.

The Chairman drew the attention of the Premier to the fact that, if a definition of the practice of medicine could be now established, it would be possible to protect the public from the irregulars, and that the definition as given in the Commissioner's report (page 66 Statutory Changes) was agreeable to the College of Physicians and Surgeons and the Ontario Medical Association.

The Chairman further drew the attention of the Premier to a letter published by the Advisory Committee (Globe, May 3), in which the stand taken by the Profession in regard to the practice of medicine was clearly put forward. He also said that the profession insisted upon standing by preliminary education and professional education, and the necessity of passing an examination. A license should then be granted, but that no one should be allowed to practice on the public who did not receive a license to do so; also that there was no objection to any cult providing that those practicing had proper educational ground work on which to base their diagnostic ability.

He further asked the Premier if this Committee could assure their bodies that legislation would be introduced next year to cover these facts.

Matters referring to the above were discussed informally by all the members of the Committee with the Premier. The Premier and Minister of Education were exceedingly agreeable, received the Committee in a gracious manner and assured the Committee that they recognized the very unsatisfactory condition of affairs, that they desired to clarify the atmosphere and hoped that something would be done at the next Session. There could be no definite promise, but they would look favorably upon any suggestion dealing with the question that could be made through the Ontario Medical Association or the College of Physicians and Surgeons; that they would take the matter up at once with the Cabinet and see how the matter could be introduced and carried through the House.

The Premier drew the Committee's attention to the fact that in public matters of this kind the opinions of the members of the House varied considerably, and that in none of the several groups of the House was there an unanimity of opinion. He felt, however, that the situation as it exists was unsatisfactory, and that he would do anything in his power to clear that situation. He drew the attention of the Committee to the large volume of correspondence that had reached him on this matter, and that some of it was from very prominent people.

The Committee was exceedingly well pleased with the reception given, and felt that a considerable advance had been made toward getting medical legislation at the next Session.

(Sgd.) EDMUND E. KING,
Chairman.

Moved by Dr. Anderson and seconded by Dr. Cruickshank:

That this Committee on General Purposes approve of the appointment of the Joint Advisory Committee members as follows: one member from each of the Medical Faculties actively engaged in teaching in this Province; three members from the Council of the College of Physicians and Surgeons, and three members from the Ontario Medical Association, the duties of this Committee being to co-ordinate the efforts of the bodies they represent with reference to medical legislation, and to carry on such propaganda and publications in keeping with the advancement of proper medical legislation in this Province. Carried.

Moved by Dr. Elliott and seconded by Dr. Argue:

That the incoming Board of Directors be instructed to prepare a resolution to be sent to the Canadian Life Officers' Association, requesting a fee of $5.00 for medical examinations, and further that all American Companies doing business in Ontario be forwarded a copy of this resolution. Carried.

Moved by Dr. Anderson and seconded by Dr. Argue:

That, in future, communications or representations made to, or before, the Provincial Government, having any specific reference to the Hodgins' report be deleted. Carried.

Moved by Dr. Oliver and seconded by Dr. Henderson:

That an honorarium of fifty dollars ($50.00) be paid to our solicitor, Lt.-Col. N. M. Young, as a slight token of our appreciation of the excellent services which he has rendered during the past year. Carried.

Moved by Dr. Mullin and seconded by Dr. Argue:

That the report of this Committee as a Whole, as amending the complete report of the Executive Committee, be received and approved, and accordingly reported back to the Chairman of the Committee on General Purposes. Carried.

Dr. Bruce, Chairman of the Committee of the Whole, in quitting the chair, reported back to the Chairman of the Committee on General Purposes the action which had been taken by the Committee as set forth in the preceding resolution. Dr. Farley resumed the chair, the Committee as a Whole adjourning, and the Committee on General Purposes again coming into session.

Moved by Dr. Anderson and seconded by Dr. Oliver:

That the report of the Committee as a Whole be adopted. Carried.

The Consideration of the Treasurer's Report.

The Honorary Treasurer, Dr. Cameron, in reviewing the printed report, outlined a budget for the ensuing year showing the necessity of again collecting the Guarantee Subscriptions.

Moved by Dr. Cameron and seconded by Dr. Bingham:

That the Treasurer's report be received and approved. Carried.

Moved by Dr. Henderson and seconded by Dr. Cameron:

That in future the Treasurer's report be for the calendar year rather than for the Association year. Carried.

Report of the Committee on Credentials and Medical Ethics.

Moved by Dr. Elliott and seconded by Dr. Argue:

That the report be received. Carried.

Report of the Committee on Legislation and By-laws.

Moved by Dr. Young and seconded by Dr. Elliott:

That the sentence in the report referring to eight ounces, be not adopted, but that the balance of the report be approved. Carried.

Report of the Committee on Education.

Moved by Dr. Elliott and seconded by Dr. Mullin:

That the report be received. Carried.

Moved by Dr. Anderson and seconded by Dr. Bruce:

That that section of the report down to the bottom of page twenty-six excepting the last five lines, be approved. Carried.

Moved by Dr. Bruce and seconded by Dr. Anderson:

That the balance of the report be approved. Carried.

Report of the Programme Committee.

Moved by Dr. Mullin and seconded by Dr. Secord:

That the report be received and adopted. Carried.

Report of the Delegates to the Canadian Medical Association.

Moved by Dr. Bruce and seconded by Dr. Anderson:

That the report be received and approved. Carried.

Dr. Geo. A. Bingham in speaking to this report, outlined the activities of the Re-organization Committee of the Canadian Medical Association which strongly advocates complete reorganization of the Canadian Medical Association with definite provincial participation, and the advisability of a composite fee.

Report of the Committee on Hospital Standardization.

Moved by Dr. Bruce and seconded by Dr. Cameron:

That the report be received and approved. Carried.

Dr. MacEachern of Vancouver was invited to speak to this report, and in a few pointed remarks stated that he hoped that the Province of Ontario would measure up to the requirements as set forth in the report.

Report of the Committee on Venereal Diseases.

Moved by Dr. Bruce and seconded by Dr. Anderson:

That the report be received and approved. Carried.

Report of the Committee on Necrology.

Following is the report of the Committee on Necrology, which report was not in print in our business programme:

May 31st, 1921.

Mr. President and Gentlemen:

Your Committee regrets to report the loss by death of a large number of the profession in Ontario, in all 42, many of whom had been active and energetic members of the Ontario Medical Association.

The death of Dr. W. J. Gibson, Belleville, who was president of the Association in 1898-1899, removed one who was recognized as an outstanding practitioner in the Province.

Dr. Hugh MacCallum of London, widely known both as Consultant and Educationalist, died of pneumonia, Jan. 25th, 1921.

Professor W. H. Ellis, Professor of Toxicology at the University of Toronto, was always a warm friend to the profession, although he devoted himself to academic work.

Others whose loss must be recorded are:

Dr. Thos. Beeman, Perth.
" Hugh S. Bingham, Toronto.
" Robt. A. Bowie, Brockville.
" C. Day Clark, Toronto.
" C. H. R. Clarke, Newmarket.
" John H. Comfort, St. Catharines.
" Jos. W. Cull, Mitchell.
" Walter S. Ferguson, Toronto.
" Wm. J. Fischer, Waterloo.
" David Gibb Fleming, Toronto.
" C. E. Graham, Hull.
" John Grant, Woodville.
" T. Gray, Acton.
" W. J. Greig, Toronto.
" J. T. I. Halliday, Peterboro.
" Archibald Henderson, Hamilton.
" Thos. Hossack, Lucan.
" S. T. Hudson, Roslin.
" J. Hulton, Forest.
" C. A. Jones, Mt. Forest.
" John S. King, Toronto.
" Max Otto Klotz, Ottawa.
" C. H. Lusk, Oakville.
" R. M. Mason, Fenelon Falls.
" James C. McAllister, Hamilton.
" John McCrimmon, Kincardine.
" James McDermott, Sunderland.
" Thos. McKenzie, Toronto.
" E. C. McNichol, Cobourg.

Dr. John A. Merrick, Merricksville.
" John Moore, Shannonville.
" John Mundell, Toronto.
" Edmund Oldham, Chatsworth.
" Robert Shearer, Simcoe.
" S. G. Thompson, Toronto.
" Frank Warren, Whitby.
" Nelson Washington, Toronto.
" Joseph Webb, Waterloo.
" Robert Jas. Wilson, Toronto.

All of which is respectfully submitted.

(Sgd.) Frederick C. Harrison,
Chairman,
Committee on Necrology.

Moved by Dr. Elliott and seconded by Dr. Oliver:

That the report be received and approved. Carried.

The Report of the Committee on Librory Matters.

Moved by Dr. Mullin and seconded by Dr. Bruce:

That the report be received and approved. Carried.

The Report of the Committee on Standardization of Drugs.

Moved by Dr. Henderson and seconded by Dr. Cameron:

That the report be received and approved. Carried.

The Report of the Committee on Inter-Relations of Medical Profession and the Public.

Moved by Dr. Mullin and seconded by Dr. Secord:

That the report be received and discussion delayed until after the Round Table dinner. Carried.

Report of the Committee on the Liquor Problem.

Moved by Dr. Elliott and seconded by Dr. Secord:

That the report be received and approved.

Herewith is appended the supplementary report of this Committee, which did not appear in our printed programme:

Your Committee also desire to present the following supplementary report dealing particularly with the questionnaire recently sent out. It has been impossible to finish the analysis of the answers given, and the committee, therefore, present this merely as an interim report. It will be noticed, however, that the results so far fully justify the recommendation already made, that the Ontario Medical Association should make a strong appeal to the profession to exercise great care in the issuing of prescriptions.

Composite Report of 510 papers read.

Ontario Medical Association.

The Relation of the Physician to the Ontario Temperance Act.

1. Any legislation which is intended to stop the use of liquor as a beverage, must at the same time provide some *method* by which it may be obtained for medicinal purposes. Is your this opinion? Yes, 474-31.

2. Do you consider the *method* provided in the Ontario Temperance Act satisfactory? No, 318-176.

3. Have you any criticism to offer as to the way the clauses in the Ontario Temperance Act relating to the physician are enforced? No, 252-165.

4. Are you in favor of limiting all prescriptions (for either druggist or vendor) to a quantity not exceeding six ounces? No, 353-133.

5. Are you in favor of limiting all prescriptions (for either druggist or vendor) to eight ounces? No, 326-127.

6. Would you be in favor of issuing a Special License to physicians for the prescribing of liquor, so that any physician not wishing to prescribe, might be protected from requests by reason of not having such a license? No, 335-153.

7. What do you consider to be the average number of prescriptions per month which you find it necessary to write for internal use? 16.94.

8. Would you favor making it obligatory for all druggists to carry in stock whiskey and brandy in original six ounce packages? Yes (if possible), 306-176.

9. Last year the Special Committee asked for consideration of the following question:

Would it be advisable to strike out the portions of the Act relating to the sale of liquor by vendors on medical prescriptions (Sec. 51, subsections a, b, c.) and to substitute the following:

1. Any adult may obtain a quantity not exceeding one quart from a vendor not oftener than once a year, on making an affidavit that it will be used for medicinal purposes, and that no other member of his or her family residing under the same roof, has procured liquor from a vendor during the preceding year.

2. In order to provide for those cases in which a larger quantity of liquor is required in any one year, the Board of Commissioners shall employ regularly an appointed medical officer to make personal investigation in such cases and issue orders if he sees fit.

Would you favor such an amendment? No, 289-203.

10. The plan suggested in question No. 9 is opposed by the License Commissioners on the ground that it would increase the amount of liquor consumed for beverage purposes and so tend to defeat the purpose of the Ontario Temperance Act. Is this your opinion? No, 244-196.

11. Have you any suggestions to make whereby the working of the Ontario Temperance Act may be improved in relation to the interests of the physician? No, 162. Yes, 199.

12. Have you any suggestions to offer whereby the Ontario Temperance Act may be improved to protect the physician against the importunities of citizens who wish liquor for beverage purposes? Yes, 166. No, 161.

The circular of the License Commissioners sent out during the last few days, and also the questionnaire, in so far as it has been considered, both call attention to the danger of ethyl alcohol prescribed for external use being used for beverage purposes. We would, therefore, suggest that the License Board investigate the question as to whether spirits for external use may be denatured without making it unsuitable or dangerous.

The Commissioners in their circular state that they are considering the advisability of "delivering prescription orders in cities where dispensaries are located, for the purpose of ensuring that the liquor reaches the right place or is returned if address is in part or whole fictitious." We believe that this would eliminate some of the applicants against whom the physician has to contend. It would be necessary, however, to provide for delivery to bearer in case of emergency, the prescription being so endorsed by the physician.

In conclusion your Committee feel that the physician's burden might be lightened if it were made a misdemeanor punishable by law for any person to make application to a physician for liquor for beverage purposes.

(Sgd.) Geo. S. Young, Chairman.

Moved by Dr. Secord and seconded by Dr. Anderson:

That that portion of the report of the Committee on the Liquor Problem dealing with the results of the questionnaire sent throughout the Province, be given to the press after being passed upon by the general Association. Carried.

The meeting adjourned at 6.00 p.m. for the Round Table Dinner.

The Committee on Nominations met at 6.00 p.m. with the following members of the Committee present: Drs. Noble, Young, Bruce, Anderson (Academy of Medicine, Toronto); Drs. Argue and Hutchison (Ottawa); Dr. Longmore (Northumberland and Durham Co.'s); Dr. Boyce (Kingston); Dr. McQuade (Hastings) Co.); Dr. Oliver (Thunder Bay Dist.); Dr. Morgan (Peterborough Dist.); Dr. Niemeier (Hamilton); Dr. Secord (Brant Co.); Dr. Krupp (Woodstock); Dr. Routley (York Co.).

After the roll was called, the Committee adjourned to meet at 10.30 p.m. on this date, following the Round Table Dinner.

The Round Table Dinner which has become a fixture of our annual meetings was very well attended, over one hundred members being present. Excellent addresses were given by Prof. Gilbert Jackson of Toronto University, and Dr. A. T. Lytle of Buffalo. The Round Table conference which followed, was presided over by Dr. J. W. Crane of London, who was acting for Dr. H. W. Hill, Chairman of the Committee on Inter-relations of the Medical Profession and the public, Dr. Hill being unavoidably absent. Over thirty members of the profession participated in the three-minute limit discussion, and it was felt by those present that a very profitable evening had been spent.

Reconvened meeting of the Committee on Nominations at 11.15 p.m., Tuesday, May 31st, 1921. By a unanimous resolution of the Committee, the following Officers and Counsellors were named as the list to be submitted to the Association for election:

Officers:

President: Dr. F. J. Farley, Trenton.
1st Vice-Pres.: Dr. E. R. Secord, Brantford.
2nd Vice-Pres.: Dr. J. A. Macgregor, London.
Treasurer: Dr. G. Stewart Cameron, Peterborough.
Secretary: Dr. T. C. Routley, Toronto.

Counsellors:

District No. 1. Dr. R. J. Macdonald, Sarnia.
" No. 2. Dr. Weston Krupp, Woodstock.
" No. 3. Dr. Geo. S. Burt, Owen Sound
" No. 4. Dr. F. W. E. Wilson, Niagara Falls.
" No. 5. Dr. Geo. S. Young, Toronto.
" No. 6. Dr. E. A. McQuade, Trenton.
" No. 7. Dr. H. A. Boyce, Kingston.
" No. 8. Dr. J. Fenton Argue, Ottawa.
" No. 9. Dr. Edgar Brandon, North Bay.
" No.10. Dr. E. B. Oliver, Fort William

Moved by Dr. Anderson and seconded by Dr. Oliver:

That the President and Secretary interview the nominees relative to their names going on to the general Association. Carried.

Moved by Dr. Oliver and seconded by Dr. McQuade:

That the next annual meeting be held in Toronto, following upon the invitation very kindly extended by the Academy of Medicine, Toronto. Carried.

Moved by Dr. Noble and seconded by Dr. Young:

That the Finance Committee be re-elected. Carried.

The Finance Committee: Dr. G. Stewart Cameron (Peterborough); Dr. Mackay (Collingwood); Drs. John Ferguson and R. T. Noble (Toronto); Dr. Davey (Hamilton).

Moved by Dr. Longmore and seconded by Dr. Noble.

That the complete report of the Nominating Committee be adopted. Carried.

(To be concluded)

BRITISH COLUMBIA.

The second annual course of Clinics and Lectures, under the name of the Summer School of the Vancouver Medical Association was held in Vancouver during the week of August 22nd to 27th. That some such course was both possible and desired was evident by the registration of 180 medical men, who came from as far North as Prince Rupert, and as far East as Calgary, while the State of Washington sent an unexpectedly strong representation.

Dr. Charles Hunter of the Department of Medicine, of the University of Manitoba was the guest of honour, if such a term was applicable to one who worked so hard. His series of four clinical lectures comprised one on Nephritis, one on the nervous element in disease (which was especially popular), one on Blood pressure, both high and low, and one on Gastro-intestinal disorders; they attracted capacity audiences and awakened keen interest.

The surgical part of the programme was in the hands of the British Columbia section of the American College of Surgeons, under the presidency of Dr. I. Glen Campbell. Operation clinics and Demonstrations were given on the mornings of August 22nd and 23rd by local Fellows of the College. On the afternoons and evenings of the same days the time was well filled with scientific papers and public meetings. As visitors, Dr. J. O. Polak of Brooklyn, N.Y., and Dr. Franklin Martin of Chicago took a prominent part in the proceedings.

On August 24th and following days, from 9 in the morning to 5 in the evening, clinics were given by members of the Vancouver Medical Association, which embraced a wide range of subjects. Dr. G. S. Gordon spoke on prostatic obstruction, and Dr. J. Ewart Campbell on syphilis, showing numerous examples; Dr. A. W. Hunter, Pathologist to the General Hospital, gave a lantern demonstration of the morbid anatomy of the Kidney; Dr. Glen Campbell spoke on the more frequent affections of the Eye, and Dr. Carder and Dr. Covernton took up the important question of Infant and Child feeding. Dr. Cunningham with Dr. F. W. Brydon Jack demonstrated the use of the Bronchoscope to many interested spectators. Dr. F. C. McTavish gave an address on the Deformities resulting from infantile paralysis and their treatment. Dr. C. S. McKee, in charge of the laboratory at St. Paul's Hospital, Vancouver, spoke on the subject of Anaemia, especially of its early recognition; while Dr. Mullin, Director of Laboratories at the General Hospital, dealt with the subject of Glycosuria, following the instructions of the Committee, that the work was to be of an essentially practical nature.

Dr. Cumming with Dr. Coleman explained some of the developments of Bio-chemical methods as applied to medicine, giving a lucid description of the chemical and physiological principles underlying the determination of Basal metabolism. To Dr. T. R. B. Nelles was entrusted the demonstration of certain of the commoner forms of Skin disease and their care. Dr. Vrooman, Chief of the Rotary Clinic for the tuberculous, spoke on the recognition and treatment of that disease.

Dr. Frederic Brodie dealt with the subject of Brain injury, illustrated with examples from the late war.

Dr. Mason took Prolapse of the Uterus as the basis of his remarks and Dr. W. B. Burnett gave an excellent clinic on certain forms of Dystocia.

Dr. B. D. Gillies gave a lantern demonstration on the Electro-cardiograph, and showed numerous slides illustrative of various forms of Arrhythmia.

Dr. H. H. McIntosh and Dr. Prowd, of the X-ray departments of the General Hospital and St. Paul's Hospital respectively, took up the question of the Roentgen ray diagnosis of diseases of the chest. The slides exhibited a wonderful series of aneurisms of the thoracic aorta.

To give an air of completeness to a week which surely taxed the absorptive powers of the most ardent student, the British Columbia Medical Society held meetings on two evenings during the week and gave a Dinner at the University Club on Friday night. At these meetings the re-organisation of the Society was completed, and plans laid for an aggressive campaign in the interests of the Profession, and the Public alike.

The indefatigable superintendent of the General Hospital, in whose hands all the arrangements worked with smoothness and precision, established in the building a miniature hospital ward, and brought together a number of exhibitions of books, instruments, etc., which greatly added to the interest of the meeting.

It is expected that this, the first attempt at Post-graduate instruction in the Far West by Western men, will be repeated next year on a larger scale.

Abstracts from Current Literature

SURGERY

Skin-grafting in the Buccal Cavity. KILNER, T. P., and JACKSON, T.: *Brit. J. Surg.*, July, 1921, p. 148.

THE paper deals with a technique evolved at Queen's Hospital, Sidcup, in the treatment of facial injuries.

Cases in which the method is applicable:

a—Absence or shallowness of external alveolar sulcus.

This condition prevents the proper functioning of an artificial denture as movements of lip or cheek disturb it from its insecure bed. The disability is seen at its worst when the jaws are edentulous, and may be the result of facial injuries with or without fracture of mandible, of burns of mouth from steam or caustics, from abnormally thick lobial fraena, from band of scar tissue subsequent to rupture of alveolar abscess, or from adhesion following operation for hare-lip. Excessive absorption of alveolus following teeth extraction may act similarly and prevent the wearing in comfort of an artificial denture on the lower jaw.

b—Deficiency of the internal alveolar sulcus.

Much more uncommon and subsequent upon injury of lateral aspect of tongue and adjacent floor of mouth.

c—Other Conditions.

Trismus—depending upon scar tissue on the inner aspect of cheek requires free removal of scar tissue and its replacement with healthy epithelium. The results are most satisfactory.

After removal of maxilla.—The immediate insertion of a mould for carrying grafts prevents deformity of face, prevents post-operative haemorrhage and hastens recovery.

After tonsillectomy—grafting of raw surface shortens convalescence, diminishes post-operative haemorrhage and prevents cicatricial contraction. The pillars are sewn together loosely over a graft covered mould.

After excision of tongue. It is suggested by the authors that epitheliazation of the raw surface would permit of much improvement in articulation.

Technique:

1. Preliminary dental work consists in the fitting of suitable apparatus for retaining the graft covered mould in position and differs according to the nature of the case. The article describes and illustrates apparatus to meet different conditions.

2. Preparation of new sulcus. Scar tissue is excised, not merely sectioned, and the periosteum is exposed. Otherwise a spongy mass of tissue is left on the maxilla which interfered with the fitting of the denture. Haemorrhage is arrested by sponge pressure—ligatures not used.

3. Making the mould.

An impression of the new sulcus is now made in dental compound and is kept in position until it cools and hardens.

4. Cutting the graft. A Thiersch graft is taken from a non-hairy portion of skin—forearm or upper arm—and applied to the mould, raw surface outermost, after the mould has been removed from the mouth and thoroughly dried. The edges of graft overlap slightly, but are not redundant. The graft covered mould is now returned to position in the mouth and the fixation apparatus adjusted.

After treatment. The mould is not disturbed for ten days during which time antiseptic mouth washes are employed. The mould is then removed—sulcus gently irrigated and a new mould applied. Every two days thereafter the mould is removed and sulcus irrigated.

The mould is kept in position until the permanent denture or prosthesis is ready for wear. Otherwise the newly formed sulcus contracts rapidly and becomes partially obliterated. Later on this tendency disappears entirely.

Close co-operation between surgeon and dentist is essential to success.

A. T. Bazin.

The Utilization of the Saphenous Vein in the Radical Operation for Femoral Hernia.

(Die Verwendung der Vena Saphena bei der Radikaloperation der Schenkelhernie.) Hofmann: *Zentrabl. f. Chir.*, Aug., 1921, No. 32, p. 1158.

The methods of radical femoral hernia operation are numerous. The author suggests that after the hernial sac is resected and buried, the saphenous vein should be exposed, ligated at its upper end and doubly ligated about 1 to 2 inches below the first one. The vein is severed between the lower two ligatures. The segment is then split longitudinally and this flap is turned upwards and sutured to the pectineus and adjoining tissues covering in the femoral ring. This method has given good results.

A. B. Illievitz.

Drainage in Carcinoma of the Biliary Ducts.

(Drainage beim Karzinom der Gallengange). Hotz: *Zentralbl. f. Chir.*, July, 1921, p. 959.

Verhoogen and Wilms recommend, for defects or cicatricial contractions of the common or hepatic ducts, a submerged rubber drain which acts as an artificial duct. The author finds the same method useful in carcinoma of the hepatic duct and recommends it in cases where a radical operation is not indicated.

The parts are first examined by palpation, followed by probing the duct through the gall-bladder and the carcinomatous stricture of the duct identified. The common bile duct is incised and probed in the direction of the duodenum to find out whether the passage into the bowel is free. The success of the investigations is recognized when upon withdrawal of the probe from the direction of the bowel "white bile" is noticed to flow back.

By means of metallic urinary bougies the stricture is dilated gradually until No. 24 is used. A thin, yet sufficiently firm rubber drain, open at both ends and about 12 c.m. long—is inserted into the duct. The duct is sutured over the submerged drain. The gall-bladder is dealt with as indicated by its condition. A gauze drain is left over the duct which can be removed later through the abdominal wound. The submerged rubber drain acts as a duct for bile into the duodenum.

A. B. Illievitz.

The Value of Caecostomy in the Treatment of Malignant Disease of the Colon.

STILES, Sir H.: *Brit. J. Surg.*, July, 1921, p. 1.

THE article is a portion of an address delivered before the annual meeting of the Association of Surgeons of Great Britain and Ireland and the author refers to recent papers by Dowd of New York and Bevan of Chicago to demonstrate that there is as yet no unanimity among surgeons in the operative procedure dealing with malignant disease of the colon.

Regret is expressed that although the disease runs a chronic course with generally sufficient obvious signs to permit of diagnosis or at least to compel suspicion so many cases do not reach the surgeon until the condition has culminated in complete obstruction.

Surgical treatment is considered in (1) Cases with complete obstruction; (2) Cases prior to the development of this complication.

Cases with obstruction demand relief of obstruction in the simplest possible way and with a minimum of risk to the patient. Radical operations or even prolonged explorations are not justifiable.

The history together with absence of tumour in the rectum makes possible the diagnosis of obstruction in the colon and caecostomy is indicated. A small incision is made in the right iliac fossa, a diverticulum of the ceacum delivered and its base sutured to the parietal peritoneum and muscles.

If the relief of obstruction be urgent a *small* Paul's tube is immediately inserted.

Emphasis is laid upon the following points:

(a) Exploration through the wound is inadvisable as the site of obstruction can be determined by x-ray opaque enema after patient has recovered from the effects of obstruction.

(b) The whole caecum should not be delivered as it will at once become ballooned and distended, with rupture of peritoneal or even all of its coats.

(c) The Paul's tube should be small, as caecal contents are fluid and spontaneous healing rapidly ensues after removal of obstruction.

(d) The procedure may be done under local anaesthesia.

(e) Recovery is rapid as stasis of small intestine is relieved, and improvement in general condition usually permits of radical operation in ten days.

(f) The site and size of incision leaves free a large abdominal surface through which incision for radical operation may be undertaken without fear of contamination.

(g) The presence of the caecostomy relieves the suture line of the radical enterectomy from all tension from flatulent gas pressure and renders the convalescence smooth and uneventful.

Class 2.—Cases without obstruction: In simple cases the surgeon may decide to complete the operation in one stage by resection and anastomosis.

The only serious frequent complication is gaseous distention of the anastomotic suture line with leakage or slight necrosis giving rise to abscess or faecal fistula appearing about ten days after operation. To avoid this, surgeons have resorted to lateral anastomosis or a two stage operation such as Paul's or Mikulicz'.

Mr. Stiles for ten years has abandoned the two stage operations and after resection and end to end anastomosis he performs a caecostomy as described above, opening the bowel in twenty-four to forty-eight hours.

Convalescence is painless and uneventful; there need be no anxiety about getting the bowels to move as this usually takes place spontaneously about the end of the first week; the caecostomy wound closes without interference in about three weeks.

The writer advises caecostomy either preliminary or as part of the operation in cases of megalocolon, volvulus of sigmoid and certain cases of diverticulitis. A. T. BAZIN.

Intussusception.

PERRIN, W. S., and LINDSAY, E. C.: *Brit. J. Surg.*, July, 1921, Vol. IX., p. 46.

A PAPER based on the study of 400 cases of acute intussusception admitted to the London Hospital from 1903 to 1920.

It shows that 78.5% of the cases occurred during the first two years of life and 69.75% during the first year. The curve of incidence rises rapidly from one to five months and the majority of the cases fall within the period of from five to nine months.

A little over seventy per cent. of the cases are classified as ileocaecal or ileocolic, in other words seventy per cent. in the apex of the intussusception was formed either by the ileocaecal valve or the lower ileum usually within six inches of the valve. The authors affirm that any explanation of the cause must satisfy these two observed facts. They find such an explanation in the condition of the last few inches of the small bowel and ileocaecal valve during the period of life referred to in the paragraph above. During this time particularly from the fifth to the ninth month the ileocaecal valve is annular in shape and is covered with masses of lymphoid tissue. Also the terminal inch of the mucosa of the ileum is similarly studded with lymphoid tissue which forms a ring round the lumen of the gut. They conceive that this lymphoid tissue by becoming swollen and encroaching on the lumen of the gut could come in contact with the segment of the gut immediately below and be treated as a foreign body. This explanation is thought to be consistent with the great majority of the cases studied.

The symptoms were extraordinarily uniform. Plump healthy children are attacked with spasms of violent abdominal pain. The legs are drawn up. There may be one or even two stools from emptying of the colon which is followed by slime and blood. In 63% only was a lump felt in the abdomen. In 26% of the ileocaecal cases the intussusception presented just inside or outside the anus, in some cases within 10 to 12 hours after the onset of symptoms.

The only treatment considered is operative at a stage of the affection which will permit of reduction of the intussusception. These gave a mortality of 22%. Of 91 cases in which this was not or could not be done only 8 recovered. As in so many other conditions the rate of mortality depends on the time relative to the onset at which the diagnosis is made.

F. A. C. Srimger.

The Kondoléon Operation for Elephantiasis. Henry, A. K.

Brit. J. Surg., July, 1921, Vol. IX., p. 111.

In elephantiasis there are two chief elements, lymph stasis and overgrowth of cutaneous and sub-cutaneous tissues. The lymph stasis may be due to disease or removal of lymph glands, to disease of lymph channels, or to disease of blood vessels. Overgrowth follows upon this soakage of the tissues. The sub-cutaneous fibrous network thickens and holds in its meshes enormous quantities of fat and stagnant lymph, the skin becomes coarse like that of an elephant and the disease thus twice justifies its name.

Prior to 1911 the disease was neither properly understood nor successfully combated. In that year Lanz of Amsterdam recognized that the deep fascia was a barrier to lymph absorption; that the superficial and the deep lymph systems had few anastomoses except at their common glandular terminations; and upon this assumption he incised the deep fascia on the outer surface of thigh and introduced pedicled strips of this tissue between the muscular planes and even through trephine openings into the medulla of the femur. There was immediate diminution in the size of limb and three years later the improvement was still maintained.

Kondoléon failed with a similar technique but elaborated the method by using wide openings through the deep fascia and was successful in eight cases. Other operators have brought the total of reported successes to seventeen.

Because of the development of alveolar spaces in the sub-cutaneous tissue, drainage by small openings in the deep fascia is doomed to failure, as also is the silk strand method of Handley.

Only the pools which are tapped will be drained "leaving a vast lacunar swamp undrained."

In lymph oedema of short duration, as in the upper limb following cancer of breast, the sub-cutaneous tissue is not loculated by fibrous tissue overgrowth hence the success following Handley's operation.

The author then reports the following case:—French woman, age 34, 3 children, negative family history, vague account of some inflammatory trouble of right leg at age of 7.

Increase in size had been progressive for 27 years, and for a year or two had been associated with attacks of shivering, fever, and pain, redness and swelling of limb. The limb was of great size and from the upper portion of the adductor surface there hung a huge pouch extending almost to the knee and which impeded walking. The foot was unaffected.

A week's rest in bed resulted in no diminution.

At the first operation the large mass in upper adductor region was excised together with a hand's breadth of deep fascia subtending its base; also a large mass the whole length of outer surface of thigh and its subjacent deep fascia. Closed without drainage by skin sutures (mattress and coaptation) of silk worm gut.

Second operation, one month later, similarly removed a wedge on inner aspect of thigh to knee.

Third operation, six months later, removed an elliptical wedge from the whole length of thigh over hamstrings and also from whole length of calf.

Photographs are presented depicting the condition prior to operation and again eleven months later and four months after the last.

The limb is much smaller and the condition is not recurring in the areas operated upon where it was previously rapidly progressing.

The areas between incisions remain elephantine demonstrating that the drainage is local in its effects.

The author, whilst appreciating the merits of the operation, does not agree with the theory upon which it is based, i.e., drainage of the superficial lymphatic system into the channels of the deep lymphatic system. He presents an argument showing this to be fallacious and advances his own theory, supported by physiological and pathological authority, that the excess lymph is carried off by the venous circulation, aided by the dynamic conditions of varying pressures associated with alternate contraction and elongation of muscles.

A. T. Bazin.

The Palliative Treatment of Aneurysm by "Wiring" with Colt's Apparatus.

Power, Sir D'Arcy: *Brit. J. Surg.*, July, 1921, Vol. IX., p. 27.

The author describes the technique for wiring aneurysms by the Colt wisps of wire. These are of different sizes with varying lengths of wire and they increase from No. 1 with a total surface area of 1¾ square inches and 75 inches in length of wire, to No. 3 with 3½ square inches of surface and 150 inches of length. The wire is dull gilt and slightly granular to favor clot formation. The extremities of the wire bundles are soldered at one end and when introduced will flare out like umbrella ribs in shape because of tensile curving.

The operation of insertion is easy under local or general anaesthesia. A small skin incision exposes the most pulsatile portion of the sac and a trocar and cannula is pushed into the cavity of the sac. The former is withdrawn with a spurt of blood if through the clot, if any, in the aneurysm. The wire bundle is then introduced into the cannula and pushed on into the sac, the soldered end entering last.

There is no after bleeding and very few symptoms and the relief from pain is usually prompt.

Sixteen cases are recorded and the results are very encouraging. Several died early after operation and one ten years later, while several cases are alive and well from two to eleven and a half years after operation.

C. K. P. Henry.

Methods to Secure End-to-End Suture of Peripheral Nerves.

Naffziger, H. C. *Surg. Gynec. and Obst.*, March, 1921, Vol. 32, p. 193.

Due to improvement in operative technique, end-to-end suture of peripheral nerves is becoming much more often possible, so eliminating the need for nerve grafts. So anxious are some surgeons to attain this object, that they resort to resection of the bones of the extremities in order to secure the required shortening. The author considers that the cases justifying this measure must be rare.

The methods found the most useful by the author, to obtain apposition of the divided nerve ends are as follows.

1st. Free mobilization of the proximal and distal portions of the nerve. The incisions must be of sufficient length to free the muscular twigs above and below the scar. Greater mobility is obtained and the scar is approached from the two sound and normal portions of the nerve. For operations on the sciatic in the thigh an incision is used which extends from the buttock to the knee.

2nd. Transposition of the nerve to a shorter route than the normal one. The ulnar nerve at the elbow is transplanted from behind the condyle to the flexor surface beneath the superficial muscles.

The musculo spiral may be transposed from the groove on the back of the humerus to the anterior surface.

3rd. Favorable posture of the extremity to shorten the distance to be overcome.

The main trunks lie for the most part on the flexor surfaces or may be transposed to that situation. Flexion of the joint will considerably reduce the gap between the divided ends of the nerves.

4th. Gradual lengthening of the nerve by a two-stage operation.

The fibrous ends are sutured together at the preliminary operation and gradual extension continued for two months when the nerve is resected and an end-to-end suture performed. The most desirable bed for the suture line is against uninjured muscle. Rotation of the nerve end must be avoided.

The author uses four fine silk sutures through the nerve sheath to bring the nerve ends in apposition. The nerve bundles should barely come in contact.

Posture of the limb after suture is usually maintained for 5 to 6 weeks. The writer has been successful in securing regeneration of a nerve in which a gap of 10 centimeters existed.

GEO. A. FLEET.

Observations on Fifty Cases of Hour-Glass Stomach Subjected to Operation.

THOMAS, W. THELWALL: *Brit. J. Surg.*, July, 1921, p. 37.

AFTER studying the notes of fifty consecutive cases surgically dealt with, the following observations are made:

1. Sex incidence. Great preponderance in females, 46 cases to 4 in males.
2. Symptoms. In all cases a long history (average nine years) of gastric symptoms, pain, 8 cases; pain and vomiting, 28 cases; pain and vomiting plus haematemesis, 14 cases, only three of which had severe bleeding.
3. In no patient had malignant disease supervened. Although suspected in 2 cases it was disproved at operation.
4. Definite diagnosis had not been possible in a single case by ordinary methods; radiography was essential.
5. Four cases had previously been operated upon for perforated gastric ulcer; one had had a gastroplasty; one a posterior gastro-enterostomy and one a cholecystostomy (no stone found).

The author deduces that rarely does the acute haemorrhagic type of ulcer lead to hour glass deformity—rather it is the chronic ulcer on lesser curvature with many years continuous or intermittent history.

Many of the ulcers were entirely healed, while again many were unhealed. In all the hard scar tissue contracting had produced the bilocular deformity. In many cases were present extensive adhesions to liver, pancreas, great omentum and even anterior abdominal wall.

This series does not support the view that malignant disease of the stomach is commonly engrafted upon a chronic ulcer.

The author emphasizes that radiographic examination is essential to accurate diagnosis not only of the primary condition but of associated lesions (7 cases had pyloric stenosis). Fluoroscopic readings will differentiate spasmodic from cicatricial hour-glsas. A report on the relative size of the two sacs and upon the muscular activity of the stomach wall are of great assistance in guiding the operator in choice of procedure.

He points out one fallacy, i.e., that the weight of the barium meal with patient erect displaces the pyloric sac and elongates the area of constriction so that it appears to be much lower than is actually found at operation with the stomach empty and patient recumbent. Lack of appreciation of this point has led to the performance of gastro-enterostomy of the wrong pouch.

Surgical intervention is the only possible means of cure and only after thorough exploration of stomach, front and back from cardia to pylorous, can the proper variety of procedure be adopted.

Then follows a description of the various operations performed in the fifty cases.

In 7 gastroplasty was done, in one of which with pyloric stenosis a posterior gastro-enterostomy to distal pouch was added.

In 15 cases gastro-gastrostomy was efficient.

In 14 cases posterior gastro-enterostomy to proximal pouch, in 2 of which the stoma was placed opposite the ulcer and extended into both sacs.

In 2 cases double posterior gastro-enterostomy—one to each sac was demanded where the sacs were small and constricted area extensive.

In 6 patients with extensive adhesions in lesser sac a retrocolic anterior gastro-enterostomy was possible. In 3 of these an entero-enterostomy of the loop was added.

In one case with extensive adhesions to anterior abdominal wall the duodenum was mobilized and anastomosed to the proximal pouch above the area of adhesion.

In one case with many adhesions and also pyloric stenosis it was possible to do a retrocolic anterior gastro-enterostomy to the proximal pouch and a posterior gastro-enterostomy to the distal pouch these surfaces on the respective sacs being free from adhesions.

Two cases necessitated partial gastrectomy, in both a retrocolic anastomosis (Polya) was made.

Operative mortality. Seven deaths occurred in the series; three of broncho-pneumonia; one of pulmonary embolism on fourteenth day; one suddenly on the day following operation; and two from exhaustion.

Many of the cases were emaciated from the long continued semi-starvation.

End results. All but three were traced. Six have complained of some stomach symptoms: One operated upon 5 years back has "some vomiting." One with 3 years history has "vomiting." Two have "some indigestion." One had a severe haematemesis one year after operation but has been well for subsequent four years. Four have died of intercurrent disease. All others (30) report complete relief. "It does not appear that any particular type of operation had much to do with the final result provided a free flow from the stomach had been established."

The article is short but full of "strong meat," it is freely illustrated with clear diagrams illustrating the condition present and the procedure adopted. A. T. Bazin.

Fractures of the Carpal Scaphoid. Todd, Allan H.: *Brit. J. Surg.*, July, 1921, Vol. IX., p. 7.

Fractures of the carpal scaphoid are often overlooked, and failure to diagnose the condition early is fraught with most serious consequences to the patient, leaving him with a disabled painful wrist.

The history is one of definite, severe injury. The acute case presents a characteristic picture: Swelling appearing almost at once in the region of the "anatomical snuff-box" and limited to the dorsum of the radial half of the wrist-joint; severe pain made worse by every sort of movement; limitation of movement, especially of dorsi-flexion; and acute, even unbearable tenderness just distal to the radial styloid in the "snuff-box." In the late case one finds tenderness, and pain in extension of the wrist.

A diagnosis of sprained wrist should not be made without excluding fracture by x-ray. Details of x-ray technique are given.

The various types of fracture are discussed with the mechanism of their production, illustrated by convincing photographs.

All methods of late treatment including removal of the scaphoid are uncertain, hence the emphasis upon early diagnosis and treatment. Preliminary splinting for three weeks is essential to restore a useful degree of function. A long "cock-up" splint is the author's choice. Massage on the splint may be undertaken after the first week and after three weeks mobilization and the employment of the usual physiotherapeutic measures. F. J. Tees.

Treatment of Ectopia Vesicae. Roberts, Chas.: *Lancet*, May 28th, 1921, p. 1125.

The author employs the following method in transplanting the ureters into the rectum.

Preliminary treatment of patient with hexamine and acid sodium phosphate for several days before operation to render the parts as sterile as possible. No mention is made of any special form of anaesthesia.

Iodine sterilization of the field. A No. 2 catheter (Fr.) is introduced two to three inches into ureters and fixed by fine sutures to bladder mucous membrane ½ inch from ampulla. Circular incision made about catheter and the catheters with ureters and bladder collar 1 inch in diameter are drawn down.

A transverse incision is made through posterior wall of bladder, an assistant placing fore finger of right hand in rectum and pushing the latter forward—while the sero-muscular layer of the rectum is grasped and sutured to the bladder wound making the operation extraperitoneal. The rectum is then incised transversely and the catheters pushed through the incision into rectum. The edges of the wound in rectum are sutured fixing the catheters one at either angle of the incision. The transverse incision in bladder is sutured.

In the female the incision is made above the uterus.

Subsequent treatment. Patient is given hexamine and acid sodium phosphate as before. Catheters removed 5th to 7th day by drawing down through anus. A secondary operation six months later, when mucous membrane of bladder is excised and layers of skin sutured with running buried suture.

Results. Patient frequently develops transient seizures of pyrexia and malaise.

Patients urinate 4 to 5 times daily; bowels are regular once daily independently of urination.

The author cites four cases, the operation being satisfactory in all four. One patient coming to puberty, men struation was normal and regular.

A. D. Campbell.

SURGERY OF THE EXTREMITIES

Treatment of Long Standing Dislocations of the Hip.

Schoemaker, J. *Surg.Gynec. and Obst.*, May, 1921, p. 461.

Two cases are reported of the reduction of dorsal hip dislocations of long standing.

One was of 13 years' duration in a young woman of 23 following typhoid, the other of 3 months' duration in a man of 61, of traumatic origin. In both cases the bones showed approximately normal outlines, and by using an imitation of the Lorenz method of reducing congenital hip dislocations reduction was successful. The head must be brought to the entrance of the acetabulum with the limb placed in complete abduction after complete flexion.

Deep narcosis is necessary. Retention is by plaster of Paris spica. Both patients walked without a limp after recovery.

J. A. Nutter.

Operation for the Removal of Complete Cervical Rib.

Pool, Eugene H. *Surg. Clin. North America*, April, 1921, p. 325.

Dr. Pool presents two case reports of cervical rib, both in young women with complaints of pain and tingling or numbness in the hand. One patient in addition complained of weakness and transitory swelling of her arm. X-rays showed cervical ribs. The incision employed by Dr. Pool follows the clavicle, ½ inch above it. The cervical rib is exposed and freed in its anterior portion between the brachial plexus, which is retracted backwards, and the subclavian artery which is pulled forwards. The posterior portion is then reached by way of a vertical incision through the trapezius and levator anguli scapulae, and it is then cut off with rib forceps where it lies next the transverse process of the vertebra, the head of the rib being left. It is to be noted that incomplete cervical ribs may be attached by ligamentous prolongations to the first rib. Such prolongations should be removed, as they are often the cause of the symptoms.

J. A. Nutter.

Sling Suspension Method of Exercise in Infantile Paralysis.

Goluslen, F. J. *Surg. Gynec. and Obst.*, March, 1921, p. 274.

This is a method of avoiding the effect of gravity and friction in the exercising of muscles weakened by poliomyelitis. The arm or leg is suspended by a rope and pulley and movements are confined to making the limb sway from side to side. By changing the position of the child various muscle groups can be brought into action.

The author points out that voluntary motion is of vital importance in the treatment of infantile paralysis and considers that by this method muscle training may be begun earlier than has hitherto been possible.

Photographs of an interesting character accompany the article.

J. A. Nutter.

Reconstruction of the Hand.

Taylor, R. Tunstall: *Surg. Gynec. and Obst.*, March, 1921, p. 237.

In this article Dr. Taylor describes the operative repair of traumatisms and infections of the hand. Preparation for operation is by the time-honored method of potassium permanganate and oxalic acid following usual wash-up. Operation is done under a tourniquet. Special tendon clamps devised by the writer are described and illustrated, also special methods of tendon suture by silk.

Various methods of tendon transfer are discussed and described with illustrative cases. In the after treatment the Skirball and Lewis splints are found useful. These are illustrated. Credit is given to hydrotherapy, especially the whirl-pool bath.

J. A. Nutter.

A Rare Case of Rupture of the Biceps Brachii.

(Seltene Bicepsverletzung) (Pseudohernie). Glass: *Zentralbl. f. Chin.*, March, 1921, No. 11, p. 367.

The author tells of a case under observation from November 1st, 1920, to January 3rd, 1921. A workman 46 years of age while using a heavy hammer suddenly checked its descent to prevent a fellow workman from being injured—the arm immediately become paralysed. From October 22nd, 1920, till the end of that month he continued work with light duty. On the 1st of November, 1920, he noticed a depression in his arm on extending it. Under local anaesthesia the operation revealed the fascia of the biceps split longitudinally, the muscle torn across about its middle and a good deal of clotted blood in the space between ends. The muscle was reunited with silk, the arm in a flexed position—

the fascia sutured and wound healed by first intention.

Since January 5th, 1921, the patient is again fit for work. A. B. Illievitz.

Hallux Valgus, Rigidus and Malleus. Jansen, Mark: *Am. J. Ortho. Surg.*, March, 1921.

This paper, in which the etiology and pathology of these conditions are described, was read at a meeting of the British Orthopaedic Association June 4th, 1920. It was followed by an interesting discussion on the part of several of the most prominent of the British Orthopaedic surgeons, including Sir Robert Jones. During this discussion the point was made and largely agreed upon, that for hallux valgus and rigidus the excision of the head of the 1st metatarsal was by far the best operation. The use of the wedge operation was condemned owing to the liability to recurrence of the deformity, as also the simple removal of exostosis from the prominent aspect of the joint.

In the case of hallux valgus in young people, associated with rheumatoid, Mr. Trethowan strongly advised against operation of any kind. Where the sesamoid bones are adherent under the great toe joint and are a source of disability their removal is indicated. J. A. Nutter.

ANAESTHESIA

A New General Anaesthetic: Its Theory and Practice. Wallis, R. L. MacKenzie and Hewn, C. Langton. *Lancet*, June 4th, 1921, p. 1173.

Part I.—By R. L. MacKenzie Wallis

It was found that pure ether could be given in large quantities without producing anaesthesia; only intoxication was produced. It was obvious that the anaesthetic properties of good anaesthetic ether were wholly due to one or other of the compounds found in it. Samples of various ethers made from industrial spirit, a mixture of ethyl and methyl alcohols, were examined and found to contain not only the three ethers—dimethyl, diethyl and methyl ethyl ether, but in addition abundant impurities—alcohol, water, acetone, mercaptan and thio-ethers. Impurities formed by oxidation of the ether include aldehydes, peroxides, and acids. Carefully prepared samples of ether naturally contain very small quantities of these impurities, but the purer the sample the more of it is required to produce anaesthesia.

The purified ether was used as a vehicle for the anaesthetic compound. The writers found that, using good samples of anaesthetic ether, before distillation no ethylene or carbon dioxide were absorbed, but after distillation large quantities were absorbed, and the resulting mixture was extremely potent as an anaesthetic.

Ethylene itself, prepared from ethylchloride and sulphuric acid possesses very little anaesthetic power. Ether and carbon dioxide were found to be without action as an anaesthetic.

The authors conclude that ketones were largely responsible for the anaesthetic properties of the ether they prepared. A mixture of ketones proved to be very potent and was dissolved in pure ether. The anaesthetic action was enhanced if the mixed ketones were first treated with carbon dioxide and ethylene.

The process of manufacture was undertaken by Messrs Savoy and Moore who have placed it on the market under the name of "Ethanesal."

Part II.—By C. Langton Hewn

Ethanesal was administered in a large number of cases. Respiration was found to be quieter than with ether. There was less irritation, less cough, and less salivation. It was given to ten cases of well marked bronchitis, none of whom showed any aggravation of their symptoms.

As regards systolic blood pressure this anaesthetic occupies a position half way between chloroform and ether. The pulse pressure does not rise as high as with ether, yet at the end of the operation and afterwards, when the patient is conscious, it is higher than with ether or chloroform.

Ethanesal has been used by the writer in mitral regurgitation, congenital pulmonary stenosis, in one case of advanced mitral stenosis with auricular fibrillation, in marked anaemia from haemorrhage and other causes, in neglected perforated gastric and duodenal ulcers, neglected intussusception, toxemia of pregnancy, in three cases of well established diabetes mellitus and many other conditions without apparent ill effects.

He found it sometimes possible to get analgesia without anaesthesia. Post anaesthetic vomiting was less than after ether or chloroform, and recovery quieter. Taste and smell are practically non existent with ethanesal. The best method of induction of anaesthesia was found to be with Clovers' inhaler, which was later changed for an open mask. Nitrous oxide as a preliminary was found to be unnecessary. Ethanesal was also used satisfactorily by the intratracheal method. W. B. Howell.

RADIOLOGY

Observations on the Behaviour of the Normal Pyloric Sphincter in Man.

McClure, C. W., and Reynolds, L.: *Am. J. Roentgenol.*, Vol. 8, p. 158, April, 1921.

Results obtained from experimental studies of animals can be applied only in a general way to the physiology of the digestive tract in man. This article is a preliminary report dealing largely with the work bearing on the question of "Acid Control" of the pyloric sphincter in man. Experimenting on animals, Cannon and others concluded that the presence of acid in the antrum of the stomach causes relaxation of the pyloric sphincter, whilst the presence of acid in the duodenum causes the sphincter to contract. It has not been demonstrated whether or not acid or some other factor exerts the principal control over the pyloric sphincter in man. This is the problem with which the present investigation is concerned. The conclusions of the authors drawn from the experimental work in man are as follows:

1. Finely divided carbohydrates, protein or fatty food stuffs begin to leave the normal stomach within from three to ten minutes after their initial ingestion.

2. Under normal conditions the human pyloric sphincter opens regularly at the approach of each antral peristaltic wave, allows the chyme to pass through into the duodenum during an appreciable length of time, and closes when the antral peristaltic wave has spent itself.

3. The introduction of N/40, N/20 or N/10 hydrochloric acid solutions into the first, second or third portions of the normal human duodenum produced either no effect on the opening of the pyloric sphincter—as observed by means of the fluoroscope—or produced effects which were interpreted as the result of abnormal irritation of the duodenal mucosa.

4. Neutralization of the contents of the first portion of the duodenum did not prevent the closing of the pyloric sphincter.

5. Experimental results obtained offer evidence that acid is not the principal factor controlling the opening and closing of the pyloric sphincter in man. W. A. Wilkins.

Subphrenic Pneumo-peritoneum. Produced by Intra-Uterine Insufflation of Oxygen as a Test of Patency of the Fallopian Tubes in Sterility and Allied Gynaecological Conditions.

Rubin, I. M. *Am. J. Roentgenol.*, March, 1921, p. 8.

Washed oxygen is introduced through a cannula into the uterus, the flow of gas being carefully regulated as to pressure and volume. In cases where Fallopian tubes are patent, a small sub-phrenic pneumo-peritoneum appears almost immediately which is readily demonstrated by fluoroscopy; where tubes are occluded the mercury manometer shows a rapidly increasing pressure, and pneumo-peritoneum fails to appear. The writer's apparatus is simple: his series of 150 cases show no ill results and patients have not complained of distress. In cases of patent tubes, 150 cc. of gas with a manometer reading of not more than 60 mm. of mercury is sufficient; with occluded tubes it is not safe to allow pressure to exceed 200 mm. of mercury.

The method, from a diagnostic standpoint, has obvious advantages as compared with tubal injection using opaque solutions or with abdominal section, and specifically establishes the question of patency or non-patency of the Fallopian tubes. A. S. Kirkland.

MEDICINE

Gonorrheal Endocarditis; Review and Report of a Case.

Smith, Dudley C., M.D. *Am. J. M. Sc.*, June, Vol. 161, 1921.

In reviewing previous cases reported and the experience of other observers, he draws the following conclusions:

(a) For the production of a gonorrheal endocarditis a septicaemia is necessary.

(b) That in one third of the cases reported it has been the right side of the heart affected.

(c) That the onset of an endocarditis may occur a few days after infection or be delayed until after repeated attacks of urethritis.

(d) That the process may be of a benign type resolving with little subsequent damage, or it may proceed to a malignant type.

An example of the latter he cites in detail:

A man aged 28 years contracted an acute urethritis in August, six weeks later developed chills, and after a course characterized mainly by loss of cardiac compensation with chills, fever and periods of stupor, died in December.

The anatomical diagnosis showed a gonococcal endocarditis and septicaemia; ulcerative and vegetative pulmonic endocarditis; ulcerative aortic endocarditis; mural endocarditis and a healed pericarditis. Smears from thrombi and heart's blood showed the specific Gram-negative organism, but cultures were negative.

C. F. Moffatt.

Acute Arteritis Complicating Pneumonia.

Head, George Douglas: *Am. J. M. Sc.*, Vol. 162, August, 1921.

An examination of the literature reveals that an acute inflammation of the arterial walls during the course of such infections as typhoid septicaemia, etc., is not uncommon but is a rare complication of acute pneumonia.

Three previous cases are abstracted from the literature to which are added two further cases. Both examples occurred in soldiers at a concentration camp during the convalescence from acute pneumonia.

The most prominent symptoms were sudden onset of sharp pain and tenderness radiating down the artery involved, followed by swelling and discoloration of the distal parts associated with a rise in temperature.

In both cases the process involved the arteries of the leg; from both was isolated a type IV. pneumococcus.

In the first case the arteritis produced dry gangrene of the foot entailing amputation.

In case 2 the process did not proceed beyond numbness and discolouration of the toes with small areas of ulceration and necrosis. In neither was there any reason to suspect embolism.

C. F. Moffatt.

Studies on the Dosage of Digitalis in Children.

McCulloch, Hugh and Rupe, Wayne A.: *Am. J. M. Sc.*, Vol. 162, August, 1921.

The purpose of the authors was to establish a relationship between the dosage of digitalis and the body weight such as has been worked out in the case of adults. The patients used were children up and about the wards to the number of thirty-six, with no recognizable heart disease. The dosage was the same as in adults, allowance being made for weight and age, the estimated total dosage being divided over a period of six days. The drug used was a standardized tincture and its effect checked by the electrocardiogram.

Considerable variation was found in the amount of digitalis necessary to bring about response.

(a) Up to the age and weight of four years children responded more readily than children over that age.

(b) In only three patients were digitalis effects seen after doses sufficient to produce optimum effects in adults.

(c) No effect noted in eight patients after dosage two to three times as great as would be required in adults.

(d) Digitalis affects in thirteen children obtained only after dosage two to three times as great as would be required in adults.

(e) In ten patients it required five times the adult dosage before effects seen.

(f) The administration of quite large doses was never attended by other than very minor evidence of digitalis action.

C. F. Moffatt

A Treatment of Gastric Ulcer based upon Modern Clinical, Histopathological and Physiological Investigations.

Smithies, Frank: *Inter. J. Gastro-Enterology*, July, 1921, Vol. 1, p. 13.

It is doubtful if peptic ulcer is to be considered as a clinical entity. Preferably should it be regarded as the local manifestation of a system condition, as it occurs but rarely apart from other clinical abnormalities, such as focal infections, circulatory disturbances, etc. In a series of 522 cases, the infections, arteriosclerosis and "visceral hypertonia" accounted for 60%—and syphilis and chronic anaemia for another 20%.

Fully two-thirds of all gastric ulcers are found in that part of the viscus where occurs the greatest mechanical activity; not in the fundus where HCl is secreted. It further appears that in formulating a method of treatment, it is more important to consider the mechanical factors concerned with digestion, than variations in the secretary function.

Certain important physiological facts are emphasized by Smithies; notably that the fasting stomach is in a state of tonic contraction, and is rarely empty; HC and pepsin are present and may aid in maintaining tone. Hunger is manifested by rhythmic gastric systoles. Repeated swallowing causes inhibition of gastric tonus. The entrance of food into the stomach initiates peristaltic movements which pass regularly towards the pylorus and maintain a constant pressure in the antrum; the fundus acting chiefly as a reservoir. The relaxation of the pylorus is intermittent and depends upon the presence of unneutralized acid. When this acid chyme enters the duodenum, the pylorus remains closed until it becomes neutralized, when it again relaxes and permits the ejection of more chyme, until the stomach is empty.

Very important in the author's opinion, is a proper understanding of how the main foods act in the stomach: Carbohydrate foods leave the stomach quickly, as they have no combining power, and hence allow a large amount of free HC to come into contact with the sphincter to cause rapid opening. If, however, the carbohydrate be mixed with alkaline solutions, this facility of discharge is interfered with. By the same token, protein leaves the stomach slowly as it combines with the free HC—and so retards the development of free acid which initiates the pyloric opening. Furthermore, protein food stimulates the flow of much more gastric juice than does carbohydrate. So that when this protein reaches the duodenum, there is more acid to neutralize and the pylorus remains closed for a longer period—against a strong peristaltic activity within the stomach itself. Fats remain longest in the stomach, as they excite little free HC production; and the acid control of the pylorus is reduced to a minimum. Vigorous churning of food with chyme occurs in the antrum and pylorus—the area in which occur 60% of all gastric ulcers. So that food delay in this locality accentuates any pathology already present.

The foregoing facts—Smithies believes furnish a logical ground—work for the treatment of peptic ulcer. The importance of care in selecting cases for medical treatment is dealt with operation being particularly indicated in ulcers showing much scarring or gastric deformity; or in calloused ulcers. The essentials of medical treatment are (1) Rest in bed for from one to three weeks. (2) Rest for the stomach itself—which includes avoidance of irritating medicine, gastric lavage and undue palpation. (3) Cold compresses. (4) Abstinence from food by mouth for from 3 to 7 days, during which paraffin wax is to be chewed for 10 minutes every hour, and rectal feedings are employed of alcohol and glucose saline. (5) Mouth feeding is begun from the fourth to the seventh day. The nourishment should be liquid, and given warm in small quantities. Carbohydrates should be used, 4 to 6 ounces of barley water, rice gruel, thin cream of wheat, or thin creamed vegetable soups are given every hour. Milk is not advised.

If the above points are carried out, the exhibition of large quantities of alkali or other medicines will prove to be unnecessary.

A. T. Henderson.

PEDIATRICS

Roentgen Ray and Tuberculosis in Infants and Children. O'Brien, F. W., and Ames, F. B.: *J.A.M.A.*, May 28th, 1921.

A study of 44 cases at the Boston Consumptive's Hospital.

The cases were first divided into age groups, one including children under 2 years, a second, those between 2 and 10 years, and a third containing all above 10 years.

"Final clinical diagnosis in any given case was the result of composite estimate of general constitutional findings, such as weight, fever or cough, or of various standard tests, sputum examinations and physical signs. To this was added the roentgen ray, each case being carefully studied with plates. Fluoroscopy was not much used.

Their conclusions were as follows:—

1. (a) The Von Pirquet and intracutaneous skin reactions are reliable guides to infection with tubercle bacilli and the number of positive reactions increases from infancy up through childhood. Over 10 years of age all patients react.

(b) In 26 of 36 positive skin reactions, the roentgen ray disclosed the site of infection to be intrathoracic.

2. D'Espine's sign as a clinical index of tuberculosis of the bronchial lymph nodes is of relatively little value, being elicited only 11 times as against roentgen ray evidence of glandular enlargement in 28 cases.

3. Three cases of positive sputum were found in 14 diagnosis of chronic pulmonary tuberculosis.

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RECENT SMALLPOX IN EDMONTON AND DEDUCTIONS THEREFROM.

T. H. Whitelaw, B.A., M.B., M.O.H.

Edmonton

SMALLPOX as a subject of a paper may perhaps appear to be something as to which nothing of importance could be said which is not already fully known to our profession. Nevertheless, I propose to indicate in a few brief paragraphs how it may well be regarded as a subject in which the general practitioner should be interested. Many medical men have gone through their whole course of medicine as students and may have practised many years without ever having seen a case of smallpox. It is not surprising, therefore, that the diagnosis of the disease is frequently not made until the complete development of the rash, leaves no possibility of doubt even to the inexperienced. Furthermore, the protection afforded by vaccination as a prevention, is not in my opinion being sufficiently and properly advocated by our profession as a whole in order to counteract the insidious propaganda of the anti-vaccinationists, who in too many instances succeed in deluding even very intelligent people into a belief in their extravagant claims as to the dangers and inefficacy of the operation.

Since November, 1919, Edmonton has had the disease existing in a greater or lesser degree, and it has required very strenuous work to prevent its becoming epidemic. There have been recorded during the last 21 months 390 cases of the disease. The infection in many of these cases was of a much graver type than we have been accustomed to see in the last decade, though a number of them were so mild as to be unrecognized, and were only discovered after they had infected other members of the same family or the community, who had the disease in a much more aggravated form. Of the 390 cases, 90 per cent. had never been successfully vaccinated at any time, and the ages of the other ten per cent. who were alleged to have been vaccinated successfully in infancy were adults from 30 to 75 years of age, with one exception. This exception, a 15-year old girl, had a very doubtful evidence of vaccination, which may have been spurious. A significant feature of these 39 vaccinated cases, was that in practically all of them the evidence of successful vaccination had almost disappeared and there was only one mark. Two deaths occurred, a healthy robust unvaccinated man of about 30 years of age, who had the hæmorrhagic type, dying on the fourth day before the characteristic rash had developed, and an infant born with the disease in the hospital, the mother being infected previously.

Of the 390 cases 176 were of school age or under. In many families the outbreak began with the unvaccinated children, who infected their parents before the disease was discovered and, the great majority of the 176 were over six years of age and would have been protected by vaccination, had it been possible to now enforce the Compulsory Vaccination Law as regards school children, which was so successfully carried out up till some six years ago, at which time not a single case of smallpox had developed for many years among the children in attendance at the Edmonton schools, though a number of adult cases occurred. This law became inoperative, through it being in conflict with the Truancy Act, after a test case had been tried out in the courts. The failure to have the law amended since so as to make it operative, is responsible for at least 60 per cent. of our cases.

Five children in attendance at five different schools were found to be affected, and to have exposed other unvaccinated children to the disease. Prompt vaccination of all unvaccinated children in these schools, of whom there were several hundreds, prevented any further developments among school children. With the exception of about 20 families, no opposition to this measure of prevention was experienced. On the other hand, many parents desired that their children who had already been vaccinated during the last ten years should be revaccinated, a quite unnecessary precaution, as was evidenced by the failure to take, in practically all of them.

The difficulty experienced in bringing the epidemic to an end was largely due to the fact that many cases either through a desire to avoid quarantine, or ignorance of the serious nature of even a mild attack as regards danger to others exposed, remained concealed or unreported for some time, and in consequence the protection obtainable from prompt vaccination of contacts, could not be given in time to prevent developments in those exposed who had not previously been vaccinated, or if so at too remote a period to afford complete protection. There were a number of mild cases which remained unknown and unreported until fully recovered, when examination revealed the fact that they had had the disease some weeks previously. There are unfortunately in every community a minority of entirely unvaccinated people who persist in remaining unprotected even in the presence of a threatened epidemic, and to this class belongs the responsibility of keeping the disease in existence. In every family quarantined at home where several children as well as adults were involved, the unvaccinated ones had the disease, the vaccinated ones escaping entirely, though all were exposed and lived practically together throughout the period of quarantine.

From a public health standpoint the experience of this series of cases leads to the following conclusions:—

1.—*That it is evident the disease is almost entirely communicated by direct personal contact with a previous case.* This conclusion is apparent from the fact that in at least 75 per cent. of the 390 cases, the factor of personal contact has been clearly established at a date usually 12 days previous to the appearance of symptoms.

2.—*That there is a special tendency to diagnose the disease at the outset as influenza or la grippe, the development of the rash with the rapid decline of fever and subsidence of symptoms four days later, revealing its true nature.* Cases so diagnosed by physicians were admitted to the public wards of four different hospitals. The fact that influenza and smallpox were co-existent and that the early symptoms of smallpox frequently so closely resemble those of a severe attack of influenza, probably makes such mistakes unavoidable. The matter of previous successful vaccination in a case of this kind, so important when smallpox is prevalent, is unfortunately not enquired into in many cases by the physician concerned. When smallpox exists in any community, symptoms resembling influenza, in a person unprotected by previous vaccination, should at least suggest the possibility of smallpox and cause delay in sending such a case to the wards of a general hospital. In a large number of cases remaining at home, the diagnosis of influenza was necessarily changed to that of smallpox, about the fourth day of the attack, when developments showed the disease to be of the nature of smallpox. In a few cases the disease was at first regarded as chickenpox, the mildness of the attack and the unusual distribution and character of the rash making the diagnosis necessarily difficult.

3.—*That the new regulations of the Alberta Provincial Board of Health, which permit of quarantining smallpox in a private house, under the same quarantine regulations as are in force regarding scarlet fever and diphtheria, are quite justifiable.* Over a dozen houses were so quarantined, and though much fear was manifested and very violent protests made by a number of citizens who were unnecessarily alarmed by what they regarded as a great menace to the neighborhood and particularly to themselves, no case of smallpox developed in the neighborhood of any house so quarantined though in som cases the inmates numbered from 8 to 12.

4.—*That the importance of vaccination of nurses in training in hospitals has not been given sufficient consideration.* A patient under the diagnosis of rheumatism or influenza was admitted to the Misericordia Hospital January 30, 1920. On February 2nd her symptoms having entirely subsided she was allowed to leave, though it was noted she had a few spots on her which were thought to be chickenpox, and no report was made to the Health Department. In due time four nurses in training and one patient developed smallpox as a result of exposure to this case, and it was discovered that vaccination of nurses in training had never been enforced, and as a result none of these four nurses had ever been given any protection, either since childhood or on entering the hospital. At our Royal Alexandra Hospital an orderly became infected from the fatal case of hæmorrhagic smallpox, who was admitted under the diagnosis of influenza, and soon after removed to the Isolation Hospital. Though steps were taken at once to protect all nurses, it later transpired that the vaccination of this orderly had been overlooked by the hospital authorities, to whom vaccine material was supplied with an understanding that all unvaccinated employees should be promptly vaccinated. As a result of this experience, I have strongly recommended to all hospital authorities in Edmonton that no employee, whether permanent or temporary, whether nurse or orderly, should be taken on the staff of the Hospital who, not having been previously vaccinated, refuses to submit to the operation; and there is every reason to believe that the recommendation is being and will be carried out.

5.—*That vaccination of all contacts who, there is any reason to suspect, may have been exposed, and who have not already been rendered largely immune by successful and more or less recent vaccination, is, as a measure of control, of much greater value than all other expedients combined, such as quarantine, disinfection and isolation,* though these latter should not by any means be ignored.

6.— *That the disease is in Canada gradually becoming more virulent* in type is evident from the fact that in Ontario recently among 2330 cases there were 35 deaths, or 1.5 per cent.

7.—*That the best method of vaccination, the after treatment, and care of vaccine material should be given greater consideration by our profession* with a view to securing the most perfect protection with a minimum of inconvenience. As to the best method of performing the operation, the writer strongly recommends the acu-puncture method, which is simply puncturing the skin, taking care not to draw blood, with a sterilized needle or better still a bunch of needles held together by a rubber band, through the vaccine drops, of which three are squeezed out on the skin, forming the angles of a triangle of which the sides are approximately one inch. The surface of the skin is first prepared by cleansing with alcohol, no other disinfectant being used. By this method no abrading or scratching of the skin is produced, to serve as a focus of possible external infection, as is the case with the old method so commonly recommended, and the amount of pain caused by the operation is reduced to a momentary sting.

No dressing of any kind is needed by this method, except perhaps the fastening of a piece of clean white linen into the sleeve of the undershirt where it covers the area. Corn plasters, wire cages and elaborate dressings need only be mentioned to be condemned, as being frequently the cause of very serious complications.

The necessity of keeping vaccine material in a low temperature should be emphasized. Many failures to secure results are due to the use of vaccine which has become weakened or inert by exposure to high temperature, and a number of the cases recorded, believed themselves to be immune because they had been vaccinated unsuccessfully. A professional nurse took charge of a severe case and believed herself fully protected, as she stated she was vaccinated in November, 1919, with a very sore arm as a result. When she developed the disease, examination of the arm showed no definite vaccination mark but merely a reddish discoloration, which evidently was an infected arm with little or no protection afforded. In this case a celluloid shield was worn from the beginning.

From observation of the vaccinated minority in this series of cases it would appear that the completeness of protection afforded is increased by obtaining three or four definite marks rather than one, because with few exceptions all of them had only one scar, acquired in infancy. Our experience seems to support the theory that the greater the number of vaccination scars the greater the protection afforded

By the acu-puncture method the scars resulting are usually very small in area and are no disfigurement whatever. Though the constitutional symptoms are quite definite, it is very seldom that any excessive swelling or redness of the arm results from this method of vaccination.

It should be the endeavor of our profession to eliminate as far as possible everything which tends to bring vaccination into disrepute and create doubt as to its efficiency as a prevention, and for this reason I have ventured to refer especially to what has by experience been shown to be the best method of procedure in obtaining the maximum protection with the minimum of danger and inconvenience.

A matter of interest in connection with this epidemic was the birth of a child in the smallpox hospital whose mother had recovered from a severe attack a few days previous to confinement. The child did not develop smallpox and though vaccinated with potent vaccine on the day of its birth also failed to develop vaccination.

THE ABATEMENT OF VENEREAL DISEASE.*

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THIS can hardly be called a modern problem, for the abatement of the cause of venereal disease, prostitution, has been the concern of priest, philosopher and sage, of statesman and altruist ever since mankind associated itself into communities. Indeed, as we all know, so far-reaching and indefatigable were the efforts of our ancestors in this direction and so courageous were they in leaving no stone unturned in their efforts to abolish irregular sexual intercourse, that (it must have been a counsel of despair) they made of prostitution a sacred ordinance, a holy rite, a part of religious worship, in the vain hope that that which was sacred and supernatural in its essence would cease to be a diversion, a means of livelihood, a physical gratification. This action was not so paradoxical on their part as it may seem to us upon the first glance. It was purely psychological in its application, and could psychology be brought obediently under bit and bridle in the human animal, it would undoubtedly have proved a success. But this trait like every other in man tending to virtuous impulses and deeds, is opposed by the physical, and while winning its victories every hour is also constantly sustaining almost equally numerous defeats. The Puritans of England in the seventeenth century, and their congeners, made a brave attempt to adopt the same principle, coupled and strengthened with concrete and supernatural command, but upon the whole with only very indifferent success.

It will not, perhaps, be admitted that prostitution, that is to say, irregular sexual intercourse, is in the main, the sustaining cause of venereal disease. I at once admit that such a point, so far as theory goes, is well taken, and that in strict logic it is as great a fallacy to say that irregular intercourse solely maintains venereal disease, as it would be to say that it originated it. It is clear that if venereal disease is to be abolished or even abated it must be cured in those individuals now affected by it, not only in those guilty of sexual irregularity but in its innocent victims as well. It is also true that if by some stupendous step venereal disease could be swept from humanity at once, that so far as our present knowledge of it goes any amount of prostitution would not reintroduce it

Yet, notwithstanding these axioms, the practical fact remains, and which will be acknowledged by everyone who has pondered gravely over this problem, that if irregular intercourse ceased to be practised, a brilliant prospect of the eradication of venereal disease by means of artificial cure, or at any rate, by way of natural immunity and decline of virulence, would at once present itself. Promiscuity in either sex not only diffuses it broadly and secretly, but constantly affords virgin soil in which even the most attenuated virus will regain its full virulence and the vicious stream be thus kept in its full current.

The real problem, therefore, in my opinion, in the suppression or even the practical abatement of venereal disease, is not mainly a medical, but a social one. Again, I admit that, theoretically, these maladies should be amenable to extinction by artificial, that is by curative means but the task is far and away too great to be even hopefully thought of by the professional procedures at our command at present. All that can be done to modify the evil of this great upas-tree of humanity by way of treatment and cure, great and meritorious as that work is, is but as lopping off a few twigs and leaves here and there, and it is the social axe, alone, sharpened beyond all precedent by public opinion, convention, and above all, by religious conviction, that, laid to the root of the tree, will, if ever, cause its downfall.

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*Read at Meeting of Canadian Medical Association, Public Health Section, Halifax, N.S., July, 1921.

Nor is the belief in the possibility of such an outcome so utterly extravagant, as at first blush might seem to be the case Who, one hundred—or even fifty—years ago, would have dared to say that throughout the whole of North America, north of Mexico, before this century had passed its first quarter, the drinking of alcoholic liquor would become essentially disgraceful, utterly unconventional, and abolished by popular consent. The very desire for alcoholics is fast becoming a matter of reproach, and although that desire is not comparable in strength to that so closely concerned with our subject, it is strong enough to have led many millions open-eyed to utter destruction.

In view, then, of this astonishing "about face" of the American world in the matter of alcohol, if it be really a permanent movement and not a mere hysterical impulse, we are not entirely justified in at once scouting the thought that irregular sexual intercourse may come to a like fate.

In contemplating the possibility of such an end, we must indeed look carefully about us. We must make it very certain that in attempting its accomplishment, we adopt the means and work in those channels that will bring us nearest and most quickly to its consummation. As noted already, five thousand years and more of arduous effort have not sufficed to advance the cause in any measurable way. Is it not reasonable to suppose, therefore, if all such efforts, so long continued, so strenuously applied, have been quite futile, that some fundamental error in the mechanism of our endeavors has existed from the beginning?

Personally, I have become unable to resist the thought that such has been the case. I put forward what I think has been the cardinal cause of the failure to greatly repress this irregular connection of the sexes with the utmost hesitation, and with a moral timidity not at all consonant with the spirit of the reformer. In modern times, especially, it has been the universal habit, advanced with the most insistent positiveness by the women and coincided in either inferentially or directly by the men, that in irregularities of this nature there is always a guilty party and an innocent one, the former represented by the man, the latter by the woman The result is inevitable. For hundreds of years, chastity has been the acknowledged monopoly of the feminine half of mankind and only lost through force, fraud or heartless selfishness.

The woman therefore looks out upon the world of prostitution, public and clandestine, with a detached air, with no proper sense of responsibility for the lamentable condition she views, much as a surviving pheasant might be expected to view the overflowing bag of the sportsman; grieving, indeed, at the downfall of her kind but reckoning within herself no sense of guilt with respect to the tragedy. The man alone—he it is who has done this thing, and to him are addressed all her reproaches, all her supplications for a surcease from his sinnings, his brutality and his lust, and all her demands for the protection of her sex.

To an audience of the nature of which I am now addressing, it is unnecessary to call attention to the radical falsity of this feminine view. It is not here practicable, nor would it be seemly to enter upon an argument designed to show the necessary willing collaboration of both parties in such matters, with the exceedingly rare exception of those instances which the law itself punishes with the most rigorous severity, the abuse of superior physical power, of mature over infant understanding, and even of the superior over the dependent.

Surely, in this day of equal rights and equal responsibility, woman will not acknowledge a mental or spiritual or psychological inferiority to man, and if she does not so acknowledge, then indeed the cry of "victim" is a vain one, and she must needs take upon her shoulders the full equal responsibility with the masculine half of humanity for the abounding commonness of promiscuity.

Here, I have become slowly and unwillingly convinced, is the additional force necessary to be enlisted in the age-long combat for purity, for clean living, for the divorcement of the most frightful of all diseases from the most important and sacred function that is given to mankind.

It would be easy, in this connection, to show how great an advantage rests with the woman, individually, in suppressing irregularity; but to an audience of medical men and women this is unnecessary. Indeed, beyond all doubt, in the vast majority of initial instances, feminine participation is upon an altogether different basis from that of the other participant, and is grounded upon motives that are relatively weak, and most easily suppressible, compared with the natural urge of the male, and the like impulse set up in the female by the establishment of habit.

But the vicious convention already referred to, which is largely the by-product of a pseudo-chivalry, robs the woman of all sense of responsibility, gives her over, for the moment, as a mere victim, or at most as a neutral entity, and then, upon exposure, abandons her to the cruel opprobrium of her sex.

In this matter our very civilization itself is utterly illogical. It frowns upon and denounces promiscuity to a degree beyond which it would be difficult to go, yet encourages the woman, indeed virtually compels her, by the dictates of fashion, to be constantly suggestive. I do not allude here, in any especial way, to the feminine dress of the present moment, nor to any of the up-to-date fashionable social habits. It only requires the shallowest knowledge of the history of civilized dress and social customs of the past five hundred years in order to be sure that our own day is in no way more extravagant, or pronounced in suggestivity, than were the ages that are past. Age cannot wither nor custom stale the infinite variety of artificial feminine methods of attraction. It appears a far cry, indeed, from the crinoline of our grandmothers to the attenuated skirts of the day, but the longitude of the crinoline no more atoned for the compressed waist and the expansion of the bust which accompanied it, than does the complete obliteration of the waist and suppression of the bust atone for the exposure of the limbs of today.

Is not the female, in crying out for protection, not only illogical but verging upon what might easily be mistaken for sheer hypocrisy? I am confident that no taint of the latter fault lies with her, in general. The man, in this connection, has had a real monopoly of this vile sin for ages in his servile and outward acceptance of the crime charged against him by the opposite sex.

Instead of harboring the merest shred of hypocrisy the women are free from it. One cannot impute hypocrisy to the individual who disclaims responsibility. The two are psychologically incompatible. Her natural desire for finery and the bizarre in raiment—her ruling passion—if the race is to make any progress along the lines of the subject of this sketch, must be as rigorously controlled and regulated by herself as that other overmastering impulse in the male must be controlled by him, and in this statement we catch a glimpse of the difficulty of the task that lies before male and female alike, if we are to attain anything like the same sentiment against sexual irregularity as we have achieved against cannibalism, slavery, and, to be quite up-to-date, as already noted, alcohol.

J. T. Gwathmey, New York (*Jour. A. M. A.*, Aug. 6, 1921) discusses the value of utilizing the synergistic action of magnesium sulphate with morphin as a preliminary to anæsthesia. It seems to act mechanically with morphin, holding this drug in contact with the tissues longer than it is able to maintain such contact alone; but with ether, and also with nitrous oxid and oxygen, it acts by deepening or increasing the effect, rather than by prolonging it. Hence the same amount of morphin may be used with magnesium sulphate as with sterile water. For instance, one-eighth grain of morphin in 1 or 2 c.c. of a 25 per cent. solution of chemically pure magnesium sulphate is increased in value from 50 to 100 per cent., as compared to the same amount of morphin used in sterile water. One hypodermic of the mixture will relieve pain for from ten to thirty hours., as compared with two to four hours with sterile water. When magnesium sulphate is used with ether, the latter may be cut one-third to one-half in amount. When magnesium sulphate is used with nitrous oxide and oxygen, the oxygen may be considerably increased and the nitrous oxid decreased.

THE EYE AS A SIGNAL OF DISEASE.

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THE title of my paper could be made to cover more than it is my intention to speak of at this time. Under the heading, one might properly treat of those isolated pareses of the intrinsic and extrinsic ocular muscles that are the forerunners, and for varying periods the sole expression, of organic disease of the nervous system; as well as of those inflammatory and toxic changes within the eye that are harbingers of grave constitutional disorders. But I only wish now to direct your attention to the frequency with which the symptoms, collectively covered by the term asthenopia, are manifestations of bodily ailments in general, as opposed to local (ocular) disturbance. The effort is worth while, if only to rectify a lack of understanding, which underlies on the one hand an imperfect therapy, and on the other exaggerates the general effects of local derangement.

The purpose of this paper is served by stating that the nervous apparatus of the eye forms an appreciable part of the brain's bulk; and that the eye participates through intimate connections with practically every one of the various cerebral functions. As all toxæmias affect the central nervous sytem, it follows that asthenopic symptoms must frequently form part of the clinical pictures of systemic diseases; and that ocular symptoms of local origin are necessarily heightened by systemic disturbances of any sort.

You are all, I am sure, more or less familiar with the matter in hand; but for the sake of completeness and to refresh your memories I will briefly enumerate the symptoms covered by the term asthenopia:—Headaches, generally frontal in situation, but not infrequently located in the occipital region. Typically, these subside with rest, and develop in association with use of the eyes for near work. Mental confusion of slight degree is occasionally complained of; but quite frequently one notes impaired power of concentrating the mind, and drowsiness. On the other hand, eye-strain is undoubtedly, at times, a cause of disturbed sleep, if not of actual insomnia. Vertigo in varying degrees is a common symptom, and is especially marked in those cases in which the extrinsic muscles are involved. Nausea (rarely vomiting), feelings of distress in the region of the stomach and over the heart, fill out the general picture. As purely local manifestations, one has blurring of the sight, sensations of heat and burning and grit in the eyes, as well as heaviness of the lids, and aching and fixity of the globes.

It is a common experience to note the symptoms I have outlined after confinements and major operations, during periods of nursing, and following prolonged application to work. The same can be said of loss of sleep, grief, and anxiety, and indeed, the artificial conditions of life under which men are compelled to live, in the larger communities especially, are in themselves a frequent cause of a general asthenia which expresses itself in eye fatigue. It was noted that hundreds of men who went to the front were able to discard their glasses in consequence of the betterment of health that resulted from a more vigorous life in the out-of-doors; and one now sees these same men obliged to again wear their lenses on resuming their old positions.

The bodily ailments which may express themselves in asthenopic symptoms cover the whole range of medicine; but I will cite briefly, in illustration, a few typical cases from among an almost endless series:

A young man came to me of himself complaining in their entirety of the symptoms I have outlined. He was a teacher, and believed only that his troubles were the results of his pedagogic work. The ophthalmoscope showed a double optic neuritis, the expression of an intracranial growth which will shortly end his life.

A woman, aged 43, was brought to me by her brother with symptoms supposedly attributable to eye strain. There was a negligible error of refraction, the fundi were normal, and the extrinsic muscles perfectly balanced; but the patient presented all the manifestations of an impending melancholia. I wrote a very urgent letter to the family physician pointing out the necessity of immediate steps being taken to avert a catastrophe; but unfortunately my view of the case was held to be that of an alarmist. Work was continued, and in a few weeks' time the patient entered an asylum where her state became chronic.

A composite report is that of a woman, aged 46, who complained violently of asthenopic symptoms. Her ocular needs called for a mild presbyopic correction; and her general practitioner could find absolutely nothing amiss on careful systemic examination. The view was taken that the ocular symptoms were a manifestation of an approaching change of life. Betterment of the eye symptoms followed a year later, with the occurrence of the usual physiological changes; and with the completion of the menopause the patient regained her power to use her eyes with impunity for any length of time. Cases of this sort are extremely common in ophthalmic practice. Numerous patients at the beginning of the reproductive life exhibit a similar chain of symptoms.

A civil engineer, aged 27, came to me with the same complaints. I prescribed glasses for a well-marked astigmatism, which I felt sure was the cause of his discomfort, more particularly as he was using his eyes in excess for near work. He telephoned me, however, in a few days to say his suffering was unrelieved. A further trial of his correction was ordered; but a message came presently that he was under treatment in the General Hospital for typhoid fever.

A cadet at the Royal Military College returned to Montreal with the usual chain of symptoms. I went carefully over the case, but could find no change from my findings of a year previous. The discomfort on reading continuing, I examined the boy for a second time after an interval of two days, but with the same results; and my statement that the symptoms were expressive of some other bodily ailment was doubtfully accepted. The case was cleared, however, twenty-four hours later by the appearance of a rash typical of German measles.

A woman, aged 44, consulted me with the same complaints. She had a minor error of refraction, for which glasses were prescribed; but she struck me as being markedly anæmic, and I referred her to her general practitioner for treatment. The woman returned in a few weeks stating that she was still suffering, and that her practitioner had taken her symptoms lightly. The pallor was as pronounced as previously, and I again referred her to her doctor. At the end of another few weeks, the patient not having received the attention I felt she needed, I telephoned her physician that I regretfully would be obliged to turn the woman over to another practitioner if he did not take the case seriously. It was then found that the condition was one of severe anæmia, secondary to hæmorrhoids, profuse bleeding from which was of almost daily occurrence.

A man of middle age, with a moderate error of refraction, suffered for years from profound headaches and eye discomforts which, for various carefully deduced reasons, he felt were of ocular origin, but heightened by intestinal dusturbances. Ultimately febrile attacks of several weeks' duration led to the detection of an intestinal pocket through which bacterial infections had been taking place. A cure of the bowel troubles restored the patient's power to use his eyes to an almost unlimited extent without symptoms.

And so on. Allow me only to emphasize the fact that the cases I have cited are not exceptional —that they represent, indeed, a very appreciable percentage of the clientele of every ophthalmologist.

It must be obvious that only a physician, with a thorough special training, backed by a solid grounding in general medicine, is competent to look after any phase of eye work. A man so trained will divide his patients into three groups: those whose symptoms are in all probability of ocular origin; those whose symptoms are in all probability merely an expression of some general disturbance; and border-land cases.

The first group of cases will respond wholly to the treatment of the oculist; the second group falls to the general practitioner alone for solution; but in the third group the problem calls for close co-operation between the general practitioner and the specialist and a careful "follow-up" in the interest of the patient.

At discretion, glasses and local remedies may be tried out for a time to estimate exactly what part eye-strain plays in the production of the symptoms; or general measures may be first tentatively introduced; or combined local and general remedies may be prescribed from the outset.

THE VALUE OF EXPERT ANÆSTHESIA TO ALL CONCERNED.

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IN this age of scientific research, there is demand for greater efficiency in every department of the practice of medicine and surgery, and greater need of specially trained men. This is well exemplified in the matter of anæsthesia, where signal progress has been made, so that today surgery has advanced as was scarcely dreamed of otherwise. No branch of medicine has a history more replete with dramatic, even tragic incidents, due mainly to the failure of the world of medicine to grasp the value of the wonderful gift offered to them.

Few men in the history of medicine and surgery have achieved more, or done more to alleviate the distress and pain of mankind, than William Thomas Green Morton, to whom we owe the discovery of the use of *ether* as an anæsthetic, and to whom Sir William Osler referred as "a new Prometheus who gave a gift to the world as rich as that of fire, the greatest single gift ever made to suffering humanity." These men of keen intellect, such as the late Sir Frederick Hewitt, made great improvements in the methods of administration of the anæsthetic leading many into the field of expert anæsthesia, until today this work stands out as one of the foremost specialities.

This now brings me back to the title of my paper.

First, I think we all agree that whether he is conscious of the fact or not, the patient is the individual most concerned.

It is probably the most important and most trying moment in a patient's life. He is about to enter into a state of oblivion, and who knows but what, in his mind, he is facing eternity? He also has a horror of the after-effects. No wonder then that he derives comfort from the assurance beforehand of a skilled anæsthetist who is going to carry him through this crisis without trepidation as regards the induction of the anæsthetic or the after-effects.

There are so many dangerous conditions which may arise from faulty administration, such as persistent nausea and vomiting, pneumonia, lung abscess, acetonuria, albuminuria, with change in the kidney substance, change in the liver, and even change in the heart muscle. In fact, the whole organism may suffer. Where an expert has given the anæsthetic, the possible distress, and complications are reduced to the minimum and such results are of the utmost concern to the conscientious surgeon.

He is relieved of any worry, knowing that if there is any need for alarm, there is at all events one individual who knows the condition of the patient, and who can give with confidence approximate estimate of the patient's endurance. Thus assisted the surgeon is able to do his work without any interruptions, incident to faulty administration, and can perform operations otherwise often impossible. He can select the method of administration appropriate to the particular operation to be performed; he can have his patient in any position; he knows that the best judgement will be used in the choice of the drug to be administered, for the safety of the patient at the time of operation and subsequently. Any failure due to faulty administration can only bring discredit to the surgeon and detriment to the patient.

On the other hand, I know of nothing more gratifying to the surgeon, and more pleasing to the friends, than to have the patient suffer little or no bad effects from the anæsthetic, and to have the surgeon's skill rewarded as it deserves.

The after-care of the patient is reduced to a minimum and the surgeon is not worried about the horrible complications which so often follow unskilled anæsthesia.

To the general practitioner as well, the matter is of serious concern. Few realize what a trying position the family physician occupies when his patient undergoes an operation. So often he has to take the responsibility of making the choice, not only of the surgeon, but of the anæsthetist as well.

The wise and successful physician knows the seriousness of the question of surgery and anæsthesia, and as he wants to do the very best possible for his patient he often suggests obtaining the services of an expert anæsthetist.

The general practitioner, with all his multitudinous duties and his limited experience in anæsthesia, realizes that the surgeon can render greater service where an expert administers the anæsthetic and so he feels that none but the most skilled can administer an anæsthetic to *his* patient. To encourage specialism in anæsthesia to some extent would seem always to be a wise policy.

It falls to the lot of nearly all medical men, especially in smaller cities and towns and in rural districts, to administer an occasional anæsthetic; it seems to me that much better service could be rendered and better results could be obtained if in certain areas or districts one or two of the practitioners would make a specialty of the study of anæsthesia and undertake the work in these districts.

It is well recognized that almost all hospitals of any pretension appreciate the value of expert anæsthesia and provide specialists on their staffs. Opportunities have thus been afforded for the development of the art to a very high degree, with the result that the mortality under anæsthesia has been reduced to a minimum, and patients now entering hospitals have for their comfort and safety the services of men of large experience and scientific training in this art.

Among those concerned with the subject of expert anæsthesia is the layman. No one looks forward to the possibility of taking an anæsthetic. A careful business man, knowing that at some time or other he will need a lawyer, generally has some idea of whom he will consult, when necessary: and selects someone in whom he has confidence, not only for his professional skill, but for his discretion, probity and sound judgement.

Unlike the barrister or solicitor, who is chosen by the client himself, the anæsthetist must sometimes be engaged by the surgeon, without reference to the layman. There being no previous acquaintance, the confidence of the layman depends entirely on the reputation of the person chosen, his personality perhaps, or the reliance placed on the surgeon's knowledge of the anæsthetist's skill.

Few laymen trouble themselves with the actual physiological effects of an anæsthetic. What they do realize is that one places oneself absolutely in the hands of another; that one's comfort, recovery, and even life depend upon the skill of that other; and that patients have been known not to recover from the effects of an anæsthetic.

Consequently, when there is a choice available the layman naturally chooses an anæsthetist in whose expertness he has every confidence.

The Expert Anæsthetist.

All specialists are not experts. First of all, the expert must have absolute self-control. Necessarily he gets the most desperate cases to handle, and must be equal to any contingency that may occur and superior to any emergency that may arise. He must be quick to think, and just as prompt to act. He must be exact in his judgement, and be able to give explicit directions without causing undue excitement among those assisting. He must be able to detect the shadow before the actual danger appears, and quickly offset any impending catastrophe. He must never allow his attention to be distracted from his patient, although he must be aware of every movement of the surgeon, and reckon with the loss of blood, the cutting of sensitive nerves, the manipulation of internal organs; he must note the effect of all trauma. He must know on what plane of anæsthesia he is holding his patient, and must be aware of the physiological effect the drug is having.

In other words, the expert anæsthetist's whole concern is the care and safety of his patient, and the giving of such assistance to the surgeon as will enable him to perform the operation in the shortest possible time, and with the greatest ease to himself.

The anæsthetist likewise is concerned with the teaching and development of his art. It is a pity that in so many of the medical colleges and hospitals, more attention is not given to the teaching and demonstrating of the subject of anæsthesia. This is something in which our organizations should interest themselves.

There is also the education of the public in what anæsthesia is and the importance of this subject. In connection with this, I might remark that the ignorance sometimes displayed by intelligent, well-educated members of the laity is astonishing. It is not infrequently that the opinion is expressed that the anæsthetist just puts the patient to sleep and immediately leaves for another case. It seems hardly fair that the public should not have definite information on points like this.

In conclusion, I would like to say a few words on a subject that is attracting the attention of our profession at the present time, namely, the question of the lay anæsthetist.

With the knowledge and experience that is being acquired in this progressive age, through the efforts of the scientific men who are developing along their special lines, it would be a tragedy to contemplate any tendency to laxity on the part of our profession, in the entrusting of the art of anæsthesia to the hands of the lay-anæsthetist.

To begin with, it is placing the life of the patient in jeopardy.

For example, how can a nurse, who has not had a thorough training in psychology, physiology, pathology, physical diagnosis, therapeutics—or in fact any branch of medicine or surgery—intelligently carry a patient through the different stages of surgical anæsthesia?

It requires a sound general educational foundation, followed by a complete medical course; and after that, special training under an expert in anæsthesia, not to mention an inherent gift for the art, before one may claim to be an expert anæsthetist.

What nurse has ever contributed anything of scientific value to anæsthesia?

If the nurse-anæsthetist is to be employed, then why not the nurse–pathologist, the nurse-physician, the nurse-diagnostician?

How can a nurse sum up the meanings of acidosis, glycosuria or albuminuria? How can she cope intelligently with such conditions, as respiratory obstruction, or where an over-dose of morphine has been given, or a case of reflex inhibition, respiratory or circulatory? How can she determine whether or not a patient can take an anæsthetic at all, and if so, how can she know which is the proper drug to be administered in each and every case?

Do many of our profession trust the lives of their families or themselves to the services of the lay anæsthetist? Our patients have a right to the same standard of efficiency as we demand for ourselves.

This matter is not only of the utmost concern to the anæsthetist and the whole profession, but also to the public at large, who entrust their nearest and dearest as well as themselves to our honor and skill.

We all have the highest regard for the conscientious, well-trained nurse. But "let the shoemaker stick to his last." Let us each practice what we have been trained for.

Our aim has been, is, and always will be, to prove by our attainments the value of expert anæsthesia to all concerned.

AN AMBULATORY TREATMENT FOR CHRONIC ULCERS OF THE LEG.

Fraser B. Gurd, B.A., M.D., F.A.C.S.

Montreal General Hospital

IN the surgical out-patient departments of all large hospitals chronic ulcers of the leg are a frequent cause of loss of time on the part of the patient, and of heartburnings on the part of the attending surgeons, as well as a reason for the expenditure of much effort on the part of internes and nurses over dressings, which are frequently most unpleasant. The majority of cases of ulcers of the leg heal more or less readily if the patient can be admitted to the hospital, and a rigorous recumbent regime insisted upon. More particularly is bed treatment useful if it be combined with skin grafting and the treatment of the underlying condition especially varicose veins, luetic infection and chronic osteitis.

Any method which necessitates admission of the patient into hospital naturally prevents him from earning a livelihood, and at the same time occupies a surgical bed for a protracted period.

After a number of experiments on a limited scale in the treatment of less important lesions, the author has employed during the past three years in the out-patient department of the Montreal General Hospital, and in private practice, a method which has proved extremely satisfactory in the treatment of these cases; among other advantages, the patient is immediately returned to his or her occupation as a wage earner or housewife The method is not original, in so far as it refers to the treatment of ulcers with adhesive strappings. In so far, however, as the author has been able to discover, the method of application, and the exact procedures employed, have nowhere been previously described. As the results obtained have been extremely satisfactory, and have been received with much gratitude by the unfortunates who suffer from such disabilities, it is felt that a description in some detail is justified.

Davis refers to a similar method (*Davis Plastic Surgery*, p. 182) but does not seem to be very enthusiastic regarding its use. He states:—"I seldom use adhesive plaster for strapping an ulcer for the purpose of support, but often employ it as a dressing. If the ulcer is discharging, the strapping must be changed at least once in forty-eight hours. The method is expensive and has little advantage over the bandage."

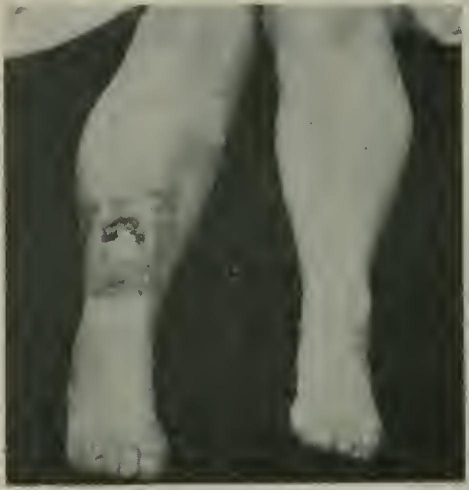

Fig. 1.—Photograph of long standing ulcer of the right shin before application of adhesive plaster.

As employed by the author, the average length of time between re-applications of the adhesive has been nearly two weeks. It is thus seen that the method is one of real economy in dressing material as well as in time In order that satisfactory results may be obtained, it is of the utmost importance that all the details of the method be strictly adhered to. Frequent observation of cases treated by internes, students, or nurses who have not thoroughly understood the importance of the details has confirmed my opinion that when properly carried out, the method is more effective than any other which the author has himself employed, or seen employed by others, and has also demonstrated that unless all details are insisted upon, the method is followed by relative failure.

The leg is bathed in washing soda solution, and thoroughly cleansed with soap suds and a soft brush. Any sloughing material is excised with scissors. After prolonged and thorough bathing, the leg is washed with petrolic ether. Occasionally alcohol may be profitably employed following the water bath for purposes of dehydration of the superficial layers of the skin. The patient then lies on his back, with his leg in a nearly vertical position against the wall This posture is maintained for from thirty minutes to two hours, at the end of which time the œdema should have entirely disappeared. The leg is by this time thoroughly dry and is ready for strapping. Too much stress cannot be laid upon the complete drainage from the leg of the interstitial fluid.

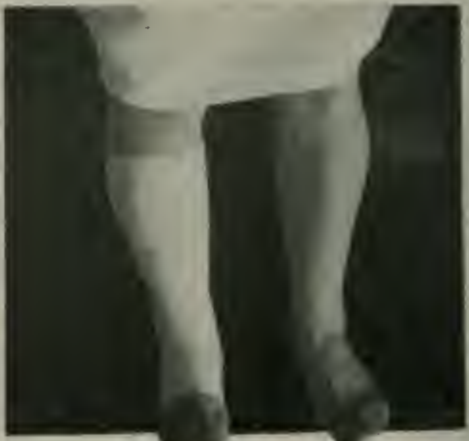

Fig. 2.—Showing method of application of strapping.

The leg is retained in a somewhat elevated position, in order that the veins may remain collapsed, and the strapping is applied. Strips of good Z.O. adhesive plaster are torn, about 2.5 to 3.5 centimeters in width, and sufficiently long to overlap when placed circularly around the leg. Starting from the base of the toes, the foot is encircled by the straps; each layer of strapping overlaps that already in position by at least 1.5 c.m. Care must be taken about the malleoli that cutting edges are not produced. It is not necessary that the heel be covered. When the ankle is passed, the strapping is continued up the leg as far as the attachments of the fascia to the tuberosities of the tibia and the head of the fibula. This is extremely important, for no matter what the position of the ulcer, there is great danger that if the strapping be not carried up to the point indicated, the tissues above will become œdemateous, and bulge over the sharp edge of the plaster, and thus suffer injury.

The adhesive is applied over the ulcer in the same way as elsewhere over the leg, although it is probably an advantage to fix half the length of the strap to the skin on one side of the ulcer, and to exert a certain amount of tension on the strap, in such a way that the edges of the ulcer are approximated toward one another.

If the ulcer be discharging freely, it is wise to apply a gauze dressing and bandage on the outside of the adhesive, in order that the discharge which exudes between the layers of strapping may be taken up. This should be changed as often as is necessary by the patient himself. The strapping need not be removed unless the discharge becomes distinctly foul. Should it become thus foul, the upper part down to, and somewhat below, the lower border of the ulcer, alone need be changed.

As a rule, the first dressing is changed at the end of from four to ten days. Thereafter from two to three weeks between dressings usually suffices. At each dressing, the same technique as regards bathing, elevation of the limb, and drying with petrolic ether, is employed.

TREATMENT OF CARBON MONOXID POISONING.

CARBON monoxid poisoning is so common in modern communities that the death rate on its account is comparable to that from which diseases, which if not the commonest, rank close after the commonest. The therapeutics of carbon monoxid asphyxia are therefore important. Howard W. Haggard and Yandell Henderson, New Haven Conn. (*Jour. A. M. A.*, Oct. 1, 1921) believe, however, that an earnest protest is needed just now against the almost hysterical attitude which certain elements of the lay public, and even some medical writers, are taking toward this subject. Common sense and common experience as well as thoroughly grounded scientific evidence, indicate that the idea that carbon monoxid is toxic and cumulative in amounts below one part of the gas in 10,000 parts of air is without foundation. The authors and their associates have worked out a standard for exposure to carbon monoxid which may be expressed by the rule: Multiply the time of exposure in hours by the concentration of the gas in parts per 10,000 of air. If the product equals 3 or less there is no appreciable physiologic effect. If it equals 6, there is sometimes slight malaise. If it equals 9, a headache with some nausea is produced in most people. If it equals 15, the conditions are dangerous for anything beyond brief exposure. If it is more than 15, they are extremely dangerous even for brief exposure. An automobile engine may produce 1 or even 2 cubic feet or more of carbon monoxid per minute. Thus, a car warming up in a small garage (10 by 10 by 15 or 20 feet, that is 1,500 to 2,000 cubic feet), with doors closed on a cold morning, makes an atmosphere dangerous to life within five minutes or less time. It would seem at first sight that inhalation of oxygen would be indicated as the proper treatment for carbon monoxid asphyxia. A close fitting, mask and valves would be needed for the administration, for when oxygen is passed through an inverted funnel held over the face, the patient gets practically none of it But even with a good inhaler, and a well-fitting mask and valves, the therapeutic results are, in fact, not much better than with fresh air. The patient recovers or dies, according as the injury wrought during the asphyxia and the remedial forces of nature may decide. By adding from 8 to 10 per cent. carbon dioxid to the oxygen, breathing is quickly restored to normal, or more than a normal amount. With the aid of this full ventilation of the lungs, the mass action of oxygen in the alveoli quickly displaces carbon monoxid from the blood. This treatment the authors believe is the long sought and ideal therapy for carbon monoxid poisoning. Its application requires a specialized apparatus devised by them for oxygen inhalation for gassed soldiers during the war.

NITROUS OXIDE-OXYGEN ANALGESIA AND ANÆSTHESIA IN OBSTETRICS*

Wesley Bourne, M.D., and James W. Duncan, M.D.

Montreal

Mr. President and Gentlemen it is not our intention to dwell on the history of anæsthesia. Only, it is worthy of mention that not long after the discovery of nitrous oxide, Humphrey Davy, the first superintendent of the Pneumatic Institute of Clifton, England, while working on the then known gases, noticed that the inhalation of nitrous oxide relieved pain. His friend, Southey, the poet, used to visit the laboratory frequently and inhaled some. So impressed was he that the following eulogy came from his pen to his brother: "Oh, Tom! Such a gas has Davy discovered! Oh, Tom! I have had some!, it makes one strong, and so happy! So gloriously happy! Oh excellent gas bag! Tom I am sure the air of heaven must be this wonder working gas of delight!" And the anæsthetist of today often hears this paraphrased, expecially by the parturient woman. This was written in 1798, and yet it was not until forty-six years later that this elastic fluid was used as an anæsthetic, and then chiefly for dentistry for another twenty-four years until Joseph Clover, surgeon and anæsthetist, adopted nitrous oxide for general use in 1868.

Following the suggestion of Paul Bert, Klikowitsch of St. Petersburg, used laughing-gas in twenty-five cases of labour and reported satisfactory results in 1886. Then rapidly followed the reports of a host of others with results not nearly so satisfactory, so that it was entirely dropped, to be revived not until 1910 by Guedel, Webster and Davis. This revival was made possible by three factors: first, the purification of nitrous oxide by what is known as the acid wash system; secondly, by its admixture with oxygen, and thirdly, by the perfection of apparatus for the control of pressure. So perfected are these factors now that there has been an unfortunate tendency for many to think that an automatic apparatus solves all problems of technique. This, of course, is a mistake and recently there has begun a movement to create scientific interest in anæsthesia by improving the courses and clinical instruction, not only for the undergraduate medical student but for the post-graduate, to enable those who so desire to fit themselves as competent anæsthetists.

The time allotted does not permit of an exhaustive consideration of this subject, nor do we claim any originality although we had independently conceived the idea; we hope only to arouse sufficient interest by drawing attention to some salient factors.

Of the known anæsthetics, nitrous oxide is the least harmful in its immediate and remote effects on metabolism, recovery after its use is almost instantaneous and usually without post operative complications. The research works of Buxton, Chadbourne, Casto and others on human and animal subjects tend to prove that the percentage of hæmoglobin is always lowered in the anæsthetics of chloroform, ether, and nitrous oxide-oxygen. This reduction of hæmoglobin is most marked with chloroform and the anæmia is severe, recovery taking place not until after the seventh day; with ether, the maximum is at the end of twenty-four hours, after which there is a gradual return to normal in about one hundred hours. With nitrous oxide-oxygen, the reduction is only slight, but in about two hours there is a return to normal. The practical application here is that any case with a color index of hæmoglobin below sixty per cent. is hazardous with ether or chloroform. Nitrous oxide-oxygen anæsthesia is strongly indicated in anæmias where operations must be done. With all anæsthetic agents there is a reduction in the number of red blood cells, slightly less with nitrous oxide, the average extent with this agent being that of sixteen per cent. However, with nitrous oxide, the coagulation time is considerably shortened, this is never the case with chloroform, and it is only slightly shortened with ether. Again, there is a leukocytosis in anæsthesias under all agents, more marked in nitrous oxide-oxygen where the average gain is sixteen per cent., affecting chiefly the small lymphocytes and the transitional forms. All these blood changes seem to be due to an increase in the H-ion, and we must remember that this is directly influenced by oxygenation, as increased carbon dioxide tension means increased H-ion content, and this is the real constant in interpreting acidosis. The watch-word, therefore, is to avoid cyanosis and practically this means the maintaining of a good color in the capillary blood, so easily seen at the patient's ears. In shock or acidosis, whether obstetrical or otherwise, where analgesia or anæsthesia is advisable, nitrous oxide-oxygen is the agent of choice of all authorities. This was particularly emphasized by Geoffrey Marshall of London, England, and by W. B. Cannon of Boston in the surgery of our last war.

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*Read before the Montreal Medico-Chirurgical Society, April, 1921.

Now, a word about circulatory disturbances, and this is somewhat intimately connected with blood pressures. Here we find that none of the agents used are accompanied by normal readings. Cholroform causes always a very early and very abrupt fall in all readings, with a marked reduction in pulse pressure. There may be a fall in blood pressure with ether, but not nearly so marked if the administration is properly carried out, whereas with nitrous oxide and oxygen the change is an initial slight rise in blood pressure readings, returning to almost normal as soon as the first stratum of third stage anæsthesia is established, and will remain so for several hours unless some extraneous factor intervenes. On some occasions where too large percentages of nitrous oxide are given at expense of good oxygenation, there will be a fall in blood pressure but this returns to normal as soon as the anæsthetic is discontinued or oxygen added in proper percentage. In interpreting our blood pressure findings in terms of circulatory depression, we classify with McKeeson as follows:—

First degree circulatory depression is that in which there is a fifteen per cent. increase in pulse rate without change in blood pressure, or a ten per cent. decrease in blood pressure without a decrease in pulse rate

Second degree is that of increase of twenty-five per cent. pulse rate, along with a ten to twenty-five per cent. decrease in blood pressure.

Third degree, which may be known as shock definitely, is that in which the pulse rate is a hundred or more and ascending, accompanied by a progressively falling blood pressure reaching that of eighty millimetres of mercury systolic and twenty pulse pressure or less.

Again Goodman Levy of London, England, has shown that death from ventricular fibrilations in chloroform anæsthesia may occur during induction, during operation and after operation: (1) during induction in the struggling and excitement, in the removal of the chloroform and in the abrupt administration after removal or a sudden increase during a period of light anæsthesia. Also, by a combination of these three. (2) During operation by a strong sensory stimuli under light anæsthesia; and (3) after operation on removal of this drug, especially in short cases. We may here mention that Flemming's *Coroner's Statistics*, presented to the Anæsthetic Section of the Royal Society of Medicine, show rather conclusively that in the hands of the general practitioner, chloroform involves prohibitive, immediate, and remote mortality, more particularly in the presence of coexisting pathological states, systemic diseases and obstetrical complications. In the year 1911 in England and Wales alone, from the Registrar-General's reports we find that there were two deaths from chloroform every three days. There is a growing tendency to believe—and we think correctly so—that any of the injurious effects of any anæsthetic persists for longer periods than was thought possible in the past, so that the anæsthetic may be an important factor in some of the more remote post-operation complications. This makes one realize that the vulgar term "anæsthetic death" means nothing

As to the effects of anæsthetics on the liver, it has been found experimentally and clinically that there never have been any changes in the mother or child in this organ with nitrous oxide-oxygen anæsthesia. Nitrous oxide alone when pushed to a completion, produces a liver picture exactly that of ordinary asphyxiation, whereas chloroform is found both experimentally and clinically to cause swelling of the liver cells with fat infiltration and necrosis in mother and child, more particularly the child. Ether does not cause necrosis, but there is a mild form of parenchymatous degeneration and tissue swelling The works of C. H Davis of Milwaukee and Charles La Rocque of Montreal are very recent and thorough and their experiments disprove Gwathmey's belief that chloroform vapor is made safe when administered with pure oxygen.

In comparing the mortality under the several anæsthetics, we note that while the mortality rate of nitrous oxide-oxygen anæsthesia is about one in one million for short operations and one in five hundred thousand for long ones, that for ether is one in sixteen thousand, that of ethyl chloride one in six thousand, and that of chloroform one in four thousand. Even this is not a fair comparison, because nitrous oxide-oxygen is selected as the anæsthetic when all others are contra-indicated often when the patient is practically moribund. In the very worst cases is this anæsthetic selected, so it is surprising that more deaths have not been reported through its use.

Several objections to the use of nitrous oxide-oxygen have been made by many, even of our best men. One is that it requires an experienced anæsthetist: but should not this be the case for any anæsthetic? That anyone can give an anæsthetic is an idea evidently unscientific. Undoubtedly, many deaths have been caused by ignorance. Another is that its cost is considerable. This is true on first sight; but on second thought you will realize that the after effects being much less than with any other agent, your patient is saved so may days in hospital at so much per day. Personally, we prefer to take one chance in one million as against one in four thousand in spite of increased cost.

To combat the frequently expressed argument that the gases are inimical to the mother and fœtus in a toxæmic state in which cyanosis is always present, let me emphasize the fact that cyanosis produced in a normal case is a sign of poor administration. If it is possible to maintain good color in normal cases it is equally possible to maintain the same relative balance of color in the toxic cases. Indeed our experience has been that at least during the period of administration we have been able, temporarily, to dispel this toxic cyanosis. This argument against the employment of gases in this class of cases is pernicious and unjustifiable.

Persistent headache has often been quoted as a sequel to a prolonged nitrous oxide-oxygen administration. In our relatively large number of cases this complaint has not been brought to our attention, and to those who have had to combat it we would strongly advise the avoidance of cyanosis.

In our application of this method, the technique for normal labor has been as follows:—

The work is divided between the obstetrician and the anæsthetist. When the former believes labor to be definitely established he administers 1-12 to 1-6 of a grain of heroin or 1-6 of a grain of morphine. This allays the pain of the first stage to the point of almost complete dilatation of the cervix, the nitrous oxide-oxygen being more particularly reserved for the second or expulsive stage. It has been our experience that the too early use of nitrous oxide-oxygen is an unnecessarily prolonged and expensive procedure. At or near the completion of the first stage, the anæsthetist is called, who, after becoming acquainted with the outstanding details of the case, applies a blood pressure apparatus to the left arm along with a bracelet stethoscope, all tube connections being of sufficient length to avoid any inconvenience in the taking of readings. These are recorded on a chart for this purpose, together with pulse and respiratory rate. The recording of these is repeated at least every five minutes, in order that curves may be made. As explained before, from these curves the slightest depression in circulation can be detected. Recently, we have decided to chart the fœtal heart rate. Charts for these observations have been published by the National Anæsthesia Research Society. The uterine contraction is allowed to start before the gases are administered because no pain is ordinarily felt until contraction is fully established, and because of the rapidity of the action of nitrous oxide, analgesia in our experience is quickly produced, particularly in the presence of heroine or morphia. The patient is conscious of her environment so that she may carry out our instructions and yet be free from pain. She is, therefore, told to take four or five deep inhalations. The percentage of gases is impossible to determine for every case. It is safe to begin with nitrous oxide, eighty per cent., and oxygen twenty per cent., the main object being to produce analgesia and maintain good oxygenation. The varying of these figures must suit each individual case, always however, maintaining good color. Let us remember that cyanosis is never a sign of analgesia or anæsthesia. It is rather the sign of a poorly conducted narcosis. This analgesic condition is produced intermittently for each pain until the head is about to be delivered over the perineum, at which point anæsthesia takes the place of analgesia. Here again, we deliberately avoid cyanosis. With the delivery of the child, one hundred per cent. pure oxygen is given under slight pressure until infantile respiration is fully established. We find it unnecessary to slap our babies, and it is interesting to see the lobster-pink color without effort. Throughout the entire procedure, constant maternal and fœtal supervision is rigidly carried out in the observing of maternal blood pressures, pulse, respiratory rate, and color; and also of the fœtal heart.

In the toxæmias of pregnancy, the modern obstetrician and anæsthetist are, we believe, fully convinced that continuous and even moderately prolonged anæsthesia under either chloroform or ether, is detrimental to both mother and child. In many of the toxæmias, where the minor operations of obstetrics such as bougie and bag introduction are indicated, the technique may be carried out with little or no anæsthetic. Nitrous oxide-oxygen, in this particular group of cases, is the recognized method. On the other hand, where major surgery is to be performed, the choice must be between the three agents, namely, chloroform, ether and nitrous oxide-oxygen or a modification. There is no question, from the experiments so far made with chloroform, but that it has a detrimental effect on both liver and kidneys in anæsthesias of over five minutes' duration. For the sake of its ready application and powers of relaxation, the usefulness of chloroform anæsthesia must be admitted. To the case or surgeon demanding it, administration for five but certainly not ten minutes, chloroform must be considered permissible; but not without, in our opinion, jeopardizing the patient and her child unnecessarily, simply for the sake of convenience and personal equation. Locally, nitrous oxide-oxygen has not made a way for itself deeply enough into the confidence of all obstetricians; so that we have not, as yet, a very large number of cases of this class to detail. From the results which we have obtained, we feel that nitrous oxide-oxgyen is worthy of sincere consideration, not only as a primary and complete anæsthetic but as one secondary to the delivery of the child following primary chloroform administration in operative work.

In our series of cases, the majority of the Montreal Maternity Hospital, we have had to deal with vaginal hysterotomy, abdominal hysterotomy, bougie and bag induction with forceps or version as secondary to either. The conditions being those of toxic vomiting, eclampsia, chronic nephritis and diabetes. In this series we have consistently relied upon nitrous oxide-oxygen as the anæsthetic of choice. In a few isolated cases of abdominal cæsarean section, we have had to add a small amount of ether to obtain the necessary relaxation. Our total number of cases has been 190. Of these, 122 were primiparæ, the remaining multiparæ. Of the total, 142 were spontaneous and 48 artificial. Of the artificial, the conditions were:

Pyelitis	4
Renal Stone	1
Hypo-thyroidism	1
Concealed hæmorrhage	1
Cardiac Disease	4
Breech	10
Premature	5
Toxæmias of Pregnancy	26
Placenta Prævia	1
Multiple Pregnancy	3
Post-operative (App.)	1
Total	57

and the interferences for these were as follows:

Low Forceps	25
Mid-Forceps	8
Version	2
Accouchement Force	2
Vaginal Hysterotomy	2
Bougie Induction	3
Bag Induction	4
Abdominal Cæsarean Section	11

The average length of time for nitrous oxide-oxygen analgesia and anæsthesia was two and one-half hours per case in normal labor or in labor leading to forceps, the longest being ten hours and the shortest, one-half hour. There were no maternal deaths. In the uncomplicated cases, there were no deaths of children of the period of viability. In the lot, there were two fœtal deaths, one in a case of threatened eclampsia, ten hours after birth, seven months term.; and one from hæmophilia, twelve hours after birth, with a direct history of this condition on the father's side. Here gas was given for two and one-half hours. The mother was an albuminuric,

In contra distinction we may offer hospital statistics for the year 1908 and 1912 inclusive. where chloroform was practically the sole anæsthetic; and it should be stated that these supply a far greater number than we have at our disposal, and wherein, no doubt, many of the patients were in a very bad condition. However, a comparison is interesting.

(1) Albuminuria of Pregnancy:
Maternal Mortality .... Nil
Fœtal mortality 13%

(2) Nephritis:
Maternal mortality 8%
Fœtal mortality 38%

(3) Eclampsia:
Maternal mortality 11%
Fœtal mortality 29%

(4) Vomiting of Pregnancy post-operative:
Maternal mortality 5%

SUMMARY

We make the following conclusions:—

1. That nitrous oxide-oxygen is the most acceptable anæsthetic to the patient.

2. That it is the most difficult to administer properly

3 That it is the least harmful of all known anæsthetic agents to the blood, liver and kidneys of mother and child.

4 That with it the uterine contractions are decidedly stimulated.

5. The freedom from pain permits the parturient woman to use her contractions to the best advantage.

6. Instrumentation is reduced from high and mid to more frequent low forceps.

7. We have at our disposal a remarkable means of exhibition to the child of indirect oxygenation after birth.

8. As against the frequent distressing collapse of the mother in post-partum administration of chloroform, we are not liable to such an unfortunate incident after nitrous oxide-oxygen.

9. It has been established that the uterus in its systole absolutely blanches itself and as these gases are administered only during the rise and acme of the systole no nitrous oxide can be conveyed to the fœtus during that period. In a well-conducted case, the oxygen is commenced at the moment of declination of the systole and continued through the diastole until the uterus is at rest. We would emphasize particularly the necessity of this type of administration because by it alone the fœtus excapes all possibility of nitrous oxide influence.

10. In no case in our series of normal laboror, labor leading up to forceps or breech extraction, have we been able to find any condition detrimental to mother or child attributable to the use of these gases.

11. In all toxæmias the statistics, in cases where chloroform and ether have been used, in the local records, the results to mother and child have not been as favorable as those which we have been able to present to you now.

12. Above all, constant and momentary supervision is particularly imperative for this is not the work of the lazy obstetric or anæsthetic physician. This is in keeping with the motto of the Canadian Society of Anæsthetists: "We watch closely those who sleep."

Finally, we may say that it is our opinion that every obstetrician should have a working knowledge of anæsthetics as well as every anæsthetist should know obstetrics. Were this the case, there would not only be less blaming of one another but better co-operation and more efficiency.

OCCURRING DURING ANÆSTHESIA

FRENZEL reports that in eight severe cases on record of cardiac standstill associated with anæsthesia, in two of which heart massage had proved ineffectual, intracardiac injections of epinephrin were given with permanently favorable results in five. No ill effects from the epinephrin were observed. The danger of untoward accidents occurring as the result of the injections is very slight if the proper technique is used. The lasting effect of the injections depends to a great extent on the moment chosen for the intervention; only from early injections may good results be anticipated. Frenzel thinks therefore that in view of these facts intracardiac injections in cardiac standstill resulting during anæsthesia should be regarded as a routine measure for resuscitation, and that during every narcosis the instruments needed for intracardiac injection of epinephrin should be ready at hand. It should be noted, however, that epinephrin is not stable and should be renewed every three months. If artificial breathing and heart massage fail after three minutes to revive the patient, an intracardiac injection of 1 mg. of epinephrin should be given, while other resuscitative measures are continued. He reports a permanently successful case from his own experience.

RECENT PROGRESS OF THE MENTAL HYGIENE MOVEMENT IN CANADA

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Toronto

THE recent war has been a vital factor in directing medical and public attention to the many problems connected with mental abnormality. Within the last few years Canadians have commenced to realize that mental disabilities are prevalent, and as much in need of skilled attention as are physical diseases We now know that there are as many individuals in Canada suffering from mental and nervous disorders as there are those afflicted with physical ailments, and competent authorities have pointed out that mental ailments constitute a more serious obstacle to national efficiency than do physical diseases and defects. We are no longer satisfied to deal exclusively with pronounced and often chronic cases of insanity in mental hospitals, but in addition find it essential to give attention to beginning cases of mental disease, and to those who are feeble-minded. We are impressed with the fact that, when neglected, the mentally abnormal fall to the bottom of the social heap and contribute in large numbers to the ranks of our criminals, prostitutes, unmarried mothers, and paupers.

An organization that has contributed to recent advances is the Canadian National Committee for Mental Hygiene. During the last three and a half years this society has conducted surveys in British Columbia, Saskatchewan, Manitoba, New Brunswick, and Nova Scotia, and has done considerable work in the other four provinces. As a result of these activities, better facilities have been provided for the diagnosis, early treatment, care, and supervision of the class under consideration. Attention might be directed to certain specific progress that has been made.

Insane.

Canada has not been *negligent* in providing hospital accommodation for the insane. It is interesting to note that there is spent each year for mental hospital care approximately four million dollars. Extensive buildings, spacious grounds, and general attractiveness typify for the most part our institutions throughout the Dominion. From the standpoint of custody and humanitarian care much has been done There are particulars, however, in which needed progress should be made, which deserve the hearty support of the medical profession and right-minded citizens. It is a move in the right direction to increase medical staffs. In the past many institutions have been laboring under serious difficulties because the medical help was far from being adequate When one physician is called upon to minister to the needs of four hundred or more patients, he cannot possibly do justice to the needs of the situation. Our military mental hospitals were fortunate in having a full complement of medical assistance, and the splendid results achieved were a natural sequence.

One of the most valuable instruments in mental hospital treatment is occupational therapy. Experience has demonstrated that when patients are suitably occupied, mental deterioration is often checked, and recovery hastened. While this form of treatment is utilized in routine fashion throughout the Dominion, it is not employed to the limit of its usefulness. There is need for the services of more occupational aides and directors. Probably a solution of the problem will be found in the training of hospital nurses for this form of treatment. Mention should be made of the fact that occupational therapy not only pays for itself, but can with judicious administration be utilized in reducing hospital costs.

The time has now come when social workers might well be attached to the asylums. They can be utilized in paroling patients who might otherwise need more prolonged hospital care. Through the courtesy of the Quebec Government, the National Committee was authorized to conduct an experiment at St. Jean de Dieu and Verdun. A social worker was employed, who supervised parole patients and assisted in the making of home conditions desirable. As a result, a larger number of inmates were discharged, and in the space of one year the province was saved $38,186.-25. There seems to be no good reason why social workers should not form an integral part of the staff of every mental hospital in the Dominion.

For some time the medical profession have felt the need for the establishment of psychopathic hospitals that would provide observation and treatment for early cases of mental disease. In the absence of such organizations it has been necessary in many instances to postpone treatment, with disastrous results. Two years ago the Winnipeg Psychopathic Hospital was organized, and has been a boon to the community that it serves. Arrangements are now being made for the establishment of a similar institution in Toronto, and another in Montreal. There are indications that Halifax and other centres will follow suit. The current belief that insanity is generally incurable will be changed when these hospitals are placed throughout the country. It will no doubt be found that the earlier a case is treated, the better will be the prospects of cure.

Feeble-Minded.

Although the feeble-minded constitute a more serious problem from the standpoint of public safety than do the insane, nevertheless they have not in the past received the attention they deserve. Institutional facilities for pronounced cases are still sadly lacking. Ontario has accommodation for approximately one thousand at the Ontario Hospital, Orillia. The other provinces have either no institutions at all, or organizations that are too small to meet the need. It is unfortunate that in many places the feeble-minded are housed with the insane in mental hospitals. Such a procedure never works out satisfactorily. It must be admitted, however, that within the last few years the various Governments of the country have been making plans to deal with this unfortunate class in a more satisfactory manner.

Notable progress has been made in the establishment of special classes in primary schools for mental defectives. Vancouver has a creditable system in which are incorporated twelve of these special classes, and Toronto has a slightly larger number. In Halifax there are three, in Ottawa two, Winnipeg three, Regina one, Hamilton two, Guelph one, and a few others scattered here and there. In Ontario the National Committee has been co-operating with the Provincial Department of Education in making school surveys during 1921, and there is now a greater demand for special classes than there are teachers who are trained and available for the work. This latter situation will be improved in the near future because of training facilities that are being provided at the University of Toronto.

It would be impossible to over-estimate the value of special classes in the training of mentally handicapped children. We now know that the majority of the feeble-minded, if detected at an early age and if suitably trained up to the period of adolescence, and supervised thereafter, seldom give trouble. Many become trustworthy and productive citizens. It is the belief of the writer that with the provision of suitable training in our primary school system for the class under consideration, much more can be done than by any other single measure in combating criminality and vice. The point should be made clear that the feeble-minded fall into evil ways not because of mental deficiency alone, but rather because of mental enfeeblement plus the lack of early training.

It is gratifying to note that mental clinics are being established in various parts of the Dominion. At present there are three in Ontario, one in Quebec, another in Manitoba, with arrangements to establish others in the large centres of population. The clinic in Toronto has during the last few years reviewed over 6,000 cases, and has been an integral factor in the social work of the city. These mental clinics study individual cases of mental abnormality, and attempt to mete out advice that will result in the best solution that is possible in each instance. The supervision that is provided by the social worker attached often makes possible a satisfactory readjustment without recourse to an institution. It is through these mental clinics that we have learned most concerning the nature and prevalence of mental deficiency and they are useful as research centres.

The relationship that exists between mental abnormality and criminality is often intimate. Studies have shown that from 30 per cent. to fifty per cent. of the chronic, hardened, delinquent class are mentally handicapped. This being the case, it is of considerable importance to have mental specialists attached to criminal courts. In Toronto one such spends his entire time at the Juvenile Court, and Juvenile Court cases in Winnipeg are referred to the Psychopathic Hospital for examination. With this beginning it is hoped that much greater progress will soon be made. The linking together of the medical and legal professions is necessary in a great many criminal cases to bring about a successful issue.

Immigration.

Reference should be made to recent advances in immigration inspection in Canada. Heretofore we had been in the habit of admitting to our shores many who were of defective or unsound mind. Adequate facilities were lacking at our ports of entry in connection with a careful mental examination of immigrants. Since the creation of the Federal Department of Health, great improvement has been brought about, and we are rejecting a larger proportion of unfits per one hundred thousand than at any time in our history. It will soon be found that the employment of trained psychiatrists for this work will mean an economic saving We know that an immigrant who is to be cared for over a long period of years in a mental hospital costs the country from four to seven thousand dollars.

Medical Schools.

Psychiatry has been, to a considerable degree, included in the medical schools of Canada and other countries. There is a movement afoot at present, however, to give more instruction and to provide better clinical facilities. Since the advancement of mental hygiene depends in large measure upon the fitness of the medical profession to deal intelligently with mental abnormals, one cannot over-estimate the need for the best possible instruction of medical students along this line.

Conclusion.

While Psychiatry has been the most backward of all branches of medicine, indications point to progress. Physicians are beginning to realize that something may be done for mental cases, and that psychiatry forms part and parcel of their professional activities The better instruction of medical students will go a long way toward the bringing about of that desired goal—early diagnosis and early treatment. Perhaps the chief reason for optimism lies in the fact that the Canadian general public are desirous of seeing the mentally handicapped treated in the most humane and scientific manner, even if such a course means the expenditure of considerable money.

INJECTION OF GAS TO OUTLINE THE KIDNEY

AMONG the newer methods of examination brought to light during the last few years is the injection of air or gas into various body cavities, with subsequent application of the roentgen ray, revealing the outlines of various organs and, in the case of the female genital tract, showing the atencyp of the fallopian tubes. Carelli and Sordelli* have now applied a similar method to throw into relief the outline of the kidney. The technic involves a preliminary roentgenogram to show the location and relations of the second lumbar transverse process. A narrow needle, 10 cm. long, is then introduced down to this bone. When the needle touches the bone, the tip is slanted away from it, and the manometer connected with the needle begins to fluctuate as the tip reaches the adipose tissue surrounding the kidney. With the idea of inducing an emphysema in the perirenal adipose tissue, from 200 to 400 c.c. of carbon dioxid gas are injected, and a second roentgenogram is taken. The report, which is accompanied by six roentgenograms of normal kidneys and three of kidneys with calculi, indicates that, by this method, the authors have been able to show definitely the outline of the kidney, the ureter and the suprarenal gland. In the earlier experiments oxygen was used, but the investigators found that twenty-four hours were required for absorption, and hence changed to carbon dioxid. The little discomfort that patients are reported to feel is said to disappear in less than half an hour when carbon dioxid is used.—*Jour. A. M. A.*, Oct. 1, 1921.

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UNSUSPECTED SYPHILIS OF THE NERVOUS SYSTEM: ITS LABORATORY DIAGNOSIS

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IN THREE PARTS

PART III

Continued from October issue

THE EFFECT OF TREATMENT UPON THE ABNORMALITIES OF THE CENTRAL NERVOUS SYSTEM

PATHOLOGICAL changes of the central nervous system are much more common in early syphilis than are definite manifestations of nervous disease in the later stages. Many of the early abnormalities must disappear more or less spontaneously, so that in judging the effect of treatment all the improvement is not necessarily a result of the drug employed. However, treatment must have a marked effect. In 74 'positive' cases the cerebrospinal fluid was re-examined at intervals after the administration of novarsenobillon in order to determine what changes might have occurred.

The general results are summarized in the following table:—

Type	No. of 'positive cases re-examined after treatment	No. whose C. S. F. became normal.	No. whose C. S. F. improved.	No. whose C. S. F. became more abnormal.
A	0	0	0	0
B	14	6	7	1
C	29	10	15	4
D	31	5	25	1
Total	74	21	47	6

The amount of drug given to each patient varied considerably. The average was about 2.7 grams, administered intravenously in doses of 0.45 grams. It is seen that many cases became normal and many more improved, some of which had markedly abnormal cerebrospinal fluids. The results lead one to believe that if it had been possible to prolong the treatment the number of improvements would have been still larger.

Re-examination of 'doubtful' cases gave similar findings.

In addition to these improvements, naturally expected, there was a group of cases in which the abnormality of the cerebrospinal fluid was increased after treatment. This occurred in a fluid originally normal, as well as in one that had been 'doubtful' or positive. The reason was, of course, insufficient treatment. It was found sixteen times out of ninety-seven patients who were re-examined, but these men were treated under the pressure of service conditions In fifteen of them there was some sign to indicate that a cure was not progressing favourably. The exception was in a man in whom the pathological process in the central nervous system progressed while the Wassermann reaction became negative both in the blood and cerebrospinal fluid. He had no signs of nervous disease, but when re-examined the fluid contained twenty lymphocytes and therefore the nervous system could not be said to be normal.

This brings up the question of the practise of making a routine examination of cerebrospinal fluid before pronouncing a person cured. In this instance the patient had not maintained a negative Wassermann reaction in the serum during an allotted time of probation, as is generally required before a patient is said to be cured. It was the first negative serum Wassermann reaction that had been observed in him and therefore his case hardly bears directly on the question.

Fildes and Parnell (13), however, in a series of 174 'D' cases made observations on this point. These were old infections in which it was necessary to differentiate between a cured and a latent case. They found that 31 of the men had abnormalities of the eye grounds or symptoms of nervous disease so that they at any rate were not cured. The remaining 143 showed no clinical signs of active syphilis, and were the possible cures. Of these 143, however, 139 gave a positive serum Wassermann reaction and only four a negative, and of these four, none showed evidence of active disease in the cerebrospinal fluid. Therefore in this series there were no cases in which a failure to cure was revealed by the examination of the cerebrospinal fluid alone. It is possible that occasionally in such circumstances one might find an abnormal cerebrospinal fluid, but on this evidence it would hardly seem necessary to subject every patient to the discomfort of lumbar puncture before pronouncing him cured.

Apart from the one exception around whom this discussion has centred the cases in which the cerebrospinal fluid became more abnormal after treatment gave some indication that a cure was not progressing favourably. Ten of them had a recurrence of active signs—rash, sore throat, etc. In four the serum Wassermann reaction remained positive at a time when it should have become negative if a cure had been effected; and, of these, three are of special interest. Originally they had normal cerebrospinal fluids. After treatment their serum Wassermann reaction did not become negative and they were recalled to hospital. When re-examined they showed abnormal fluids but no clinical signs of disease. This indicates, that even after treatment, a lesion of the nervous system may develop in cases which had originally no sign of nervous system involvement, and that it may be detected before clinical signs of nervous derangement appear. Fortunately these men were caught when the lesions were only commencing and when further treatment could effect a cure.

The study of this series lends weight to the idea that evidences of involvement of the central nervous system should be considered important in deciding the amount of treatment a patient requires. All the men were treated according to a routine plan and therefore the bearing upon the results of treatment of an affected nervous system could be estimated. It was found that failure to cure was four times as common when the nervous system was involved as when it was normal. Cure was also less frequent in the doubtful cases than in those with normal cerebrospinal fluids. This fact lends conviction to the belief that five to nine cells per c.mm. in a cerebrospinal fluid is really an abnormally high count, and that the cases classed as doubtful were actually cases whose nervous system was already affected. It is also evident that a cerebrospinal fluid abnormal at the time of treatment makes a cure more difficult and is therefore an indication for treatment more extensive than is necessary for another patient with a normal central nervous system.

SUMMARY AND CONCLUSIONS

A large percentage of unselected cases of syphilis have central nervous system involvement as evidenced by pleocytosis and a positive Wassermann reaction in the cerebrospinal fluid. The onset of these variations may be very early. In a few cases they were demonstrable before the Wassermann reaction had become positive in the blood.

The nature of the lesion is undoubtedly a syphilitis meningitis. This conclusion is based not only upon the presence of lymphocytes in the spinal fluid but also upon the frequent appearance therein of a few polymorphonuclear leucocytes when the cell count is high. In a large proportion of the affected cases the fluid showed a positive Wassermann reaction, and in one case (with 1000 cells per c.mm.) S. pallidum was demonstrated in the fluid by dark-ground illumination. The central nervous system involvement was found in all periods of the disease. A striking feature of the investigation was the large percentage of so-called "latent" cases with spinal fluid alterations.

Another outstanding feature was the very frequent absence of symptoms or signs of disturbed nervous function. A considerable proportion, however, had lesions of the eye grounds, slight in extent but neverthelesss indicative of a commencing retinitis.

Affections of the internal ears were found not to be a reliable indication of nervous system involvement in the cases of this series.

The intravenous administration of novarsenobillon restored many cases to normal and in others effected a marked improvement in symptoms and findings. On the other hand, a few cases showed a definite resistance to treatment and in some the meningitis actually progressed in spite of repeatedly renewed treatment.

The finding of cerebrospinal fluid with increased cell count should have a profound bearing on the prognosis and treatment of a case of syphilis. As soon as the organisms have invaded the central nervous system the difficulty of bringing about a cure is increased. Failure to cure was four times as common in cases with over ten cells per c.mm. as it was in those whose fluid was normal; and was considerably more frequent in patients with five to nine cells per cmm. than in normal cases. One reason that may account for this failure is the relative inability of salvarsan and similar compounds to penetrate into the brain parenchyma. McIntosh and Fildes have demonstrated (14) that after intravenous salvarsan administration the brain tissue shows no arsenic : it may be reasoned from this that the spirochætes in the parenchyma of the central nervous system are not easily reached by the arsenical drugs and are therefore more difficult to eradicate.

This explanation is concerned with the clinical observation that if a patient with early syphilis has had treatment and does not become cured, maintaining a positive Wassermann reaction in the serum when it should have become negative, he has probably a focus of disease in his central nervous system.

In view, therefore, of the important bearing that an involvement of the nervous system has in the treatment and prognosis of syphilis, it is probable that lumbar puncture should never be omitted as a routine in the first examination of all cases of syphilis.

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A CASE OF GIARDIASIS (LAMBLIASIS) INTESTINALIS*

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DURING the great world war the role of intestinal parasites assumed considerable importance. In the course of numerous fæcal examinations, which were required, more particularly in soldiers from the Near East, organisms which formerly had possessed only an academic interest became very frequent findings.

One of the most interesting of these parasites is the flagellate, Giardia (Lamblia) intestinalis. This organism was discovered by Lambl in 1859, and later in 1879 was rediscovered by Grassi, who, at first unaware of Lambl's report, gave it the name of Megastoma entericum; but later renamed it Lamblia intestinalis.

The organism was little heard of until the recent war, when it became a surprisingly frequent finding. Fantham (1), for example, in the course of 3325 fæcal examinations in soldiers, chiefly from Mesopotamia and the Dardanelles, found Giardia 471 times. In America, Kofoid (2) found 5.3 per cent. of 1200 overseas troops (nearly all from France) and six per cent. of 300 home service troops infected. Maxcy (3), in examining stools from 89 children in the Johns Hopkins Hospital, saw Giardia in 15. Logan and Sandford (4) report its frequent occurrence at the Mayo Clinic. Three of their cases were from Canada. This is the only instance I can find in the literature where Giardia has been reported as occurring in Canadians. The following case is therefore reported to show that the organism is indigenous in Canada.

R. D., a French-Canadian boy of 5 years was sent into the Alexandra Hospital as a case of diphtheria. The past history has only a negative interest. He was born in Canada and had never been outside of the country. None of the family had been further south than Boston. The child did not have diphtheria, but did have a massive œdema of the left tonsillar region, and a severe hæmorrhagic nephritis. His temperature for ten days assumed an intermittent septic type with daily variations of four or five degrees. During this critical time it was noticed that *his abdomen frequently became distended*, and on one occasion *a small fleck of blood was seen in the fæces.* For this reason the fæces were examined and *numerous Giardia cysts were discovered.*

Following several enemata the abdominal distension subsided; but from time to time as the stools were examined, Giardia was constantly found. The vegetative forms appeared only in the stools when they were liquid (usually after a saline purge); and on one occasion only were we fortunate enough to see the motile forms.

The boy recovered from his nephritis, and was discharged quite free from gastro-intestinal symptoms.

Giardia intestinalis has been carefully studied, and the literature on the subject is becoming quite large. For a full description of its morphology the reader is referred to the more recent text-books on parasitology (5), and to the excellent description given by Wenyon (6).

The vegetative form of this flagellate is slightly less than twice the size of a red blood cell (10 to 20 u by 6 to 10 u), possesses eight flagella, and is typically pear-shaped with a large sucking disc on its ventral surface, by which it attaches itself to the epithelium of the duodenum. In this form the parasite is only found in liquid stools, and even then with some difficulty. *The diagnosis must be made by identifying the cysts.* These are oval in shape, possess two or four nuclei, and usually show two longitudinal striations, the remnants of the flagella.

In order to bring out the structure of both vegetative form and cyst, a convenient stain for wet preparations is Donaldson's stain. The stain itself does not keep; but three stock solutions can readily be made, and these will keep almost indefinitely. They are:—1. Normal saline.

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*This appears to be the first authentic case of its kind, proven to be indigenous in Canada.

2. Saturated solution of iodine in 5 per cent. potassium iodide in normal saline. 3. Saturated solution of eosin in normal saline.

When required, two parts of solution 1, one part of solution 2 and two parts of solution 3 are mixed. This is dropped on the moist preparation and soon the grosser details of the organism's structure become apparent. Permanent preparations may be made by staining with Giemsa, or by the Iron-hæmatoxylin method.

Concerning the pathogenicity of the parasite there is considerable dispute. Fantham and Porter (7) regularly produced diarrhœa in kittens and mice by feeding them human Giardia cysts. They regard Giardia as capable of producing diarrhœa in man, and consider that, since kittens and mice are susceptible, they may become carriers. Undoubtedly the great majority of those infected are symptomless carriers; nevertheless it seems probable that in some susceptible individuals diarrhœa and even dysentery may be set up.

The *mode of infection* is said to be by the ingestion of cysts, which presumably develop in the stomach or duodenum. The young motile parasite then attaches itself to the epithelium of the duodenum.

The *treatment* is unsatisfactory. The appearance of the parasite in the stool is often so capricious that it is difficult to say whether a patient is cured or not. Dobell and Low (8) examined the stools of a healthy carrier on a hundred successive days. Several times the stools were negative for a week, and once for ten days. On the same patient these authors tried a variety of drugs, but considered none of them to be efficacious. Kofoid (9) reports favorable results in rats with arsenobenzol intravenously. Carr and Chandler (10) report an apparent cure in a human case after the intravenous administration of neophenarsamine. Other drugs used have been: emetine thymol, salol, methylene blue, etc. The multiplicity of drugs recommended denotes the unsatisfactory nature of the treatment.

This organism is not likely to be encountered frequently in Canada; but it should be borne in mind as a possible causative agent in obscure cases of diarrhœa.

I am indebted to Dr. H. B. Cushing for permission to publish this case.

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PAINS IN THE BACK

GINDSTEDT has long been arguing that sciatica is the response of the sciatic nerve to irritation or strain, usually from some upset in the static balance of the body or over-exertion. His array of arguments to prove that sciatica is the response of the sciatic nerve to irritation or reflex action was summarized in The Journal, March 26, 1921, p. 903. He here reasons the same for lumbago and similar pains in the back, and tabulates data from 1,578 cases which apparently sustain this view of their neuralgic nature. The subjects were young recruits, and in fourteen there was pronounced sciatica besides, including four with both sciatica and lumbago. In all his cases the pain in the back was almost invariably on the same side as the muscular over-strain or static anomaly. A constitutional predisposition to neuralgia is generally evident, or some acquired predisposing factor such as infection, intoxication, worry, meteorologic influences or the like. Sciatica, lumbago and other so-called muscular rheumatism pains thus all belong to the class of equivalent neuralgic pathologic conditions.
—Jour. A. M. A., Aug. 2, 1921.

CONSIDERATIONS REGARDING THE SURGICAL TREATMENT OF MALPOSITIONS OF THE UTERUS*

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THERE are few subjects in gynæcology which have been more written about and discussed than that of malposition of the uterus. During the past decade gynæcology has made a most decided advance. Although practically all the lesions found in the pelvis have been definitely classified, there is still such confusion as to the proper treatment that we are apt to fall into a groove, and the only difference between a groove and a grave is one of depth. I refer to the constant operation of dilation with curettage, followed by a Gilliam suspension, as a routine remedy in all forms of uterine misplacement.

Of course the obvious criticism is that no one method should be a routine. Should custom fashion, or authority dragoon, a surgeon into effecting such mechanical repetition? True surgery is established by the end result, and the end result is and should be our only criterion of what is judicious surgery. The decision as to what operative procedure is necessary must rest upon the combined clinical findings. In considering the treatment of malpositions of the uterus, it is my purpose in this paper to consider the cases which are not benefited by surgical interference, as well as those deriving benefit from operation.

There are many conflicting opinions as to the normal, as well as the pathological position of the uterus. The probable reason for this is, that an abnormal position which will produce marked symptoms in one woman, will cause absolutely no suffering in another. The uterus is considered as part of the pelvic floor, and if a malposition exists, it means some disturbance of this structure. One of the commonest displacements is that of prolapse, which will be seen to be really a hernia of the pelvic floor.

An accurate diagnosis is of prime importance, and to make this, a careful anamnesis must be taken, followed by a physical examination, which always includes a most thorough bimanual examination. Investigate not only the pelvic, but the systemic condition of our patients. Inaccurate and careless study will result in unnecessary and improper operative procedures.

Symptoms resulting from malpositions of the uterus may first appear in the upper gastro-intestinal tract. A retroflexed uterus by pressing on the sigmoid or rectum, may interfere with the passing of the intestinal contents, and gastric distress result, with belching and discomfort after meals. Uterine pressure on the rectum may cause an anal fissure or hæmorrhoids. In the consideration of pain, it should be borne in mind that the actual severity of the pain bears no necessary relation to the gravity of the disease. Chipman has said "that backache of all the painful liars is the most perfect Ananias." Have we not all seen many times, marked malpositions of the uterus without the slightest complaint of backache. Nerve and muscle relaxation should be regarded as causative factors in backache, the uterine malposition also resulting from the cause.

Let us now consider the treatment of some of the most common malpositions. Take the young women with the acute anteflexion, complaining of scanty or absent menstrual flow, dysmenorrhœa and sterility. How disheartening has surgical intervention shown itself in this case! The routine curettage with the use of a stem pessary or a Dudley operation may relieve for a month or two, but invariably the symptoms return with increased vigor. Curettage in sterility is worthless, and even harmful, by producing a certain amount of traumatism in the endometrium, and also some disturbance in the deeper uterine tissues, with resulting cicatrices and lessened chances of pregnancy. These cases will do better on plenty of fresh air, a moderate amount of exercise, and a capsule of thyroid, pituitary, and ovarian extracts each gr. 1. given three times daily.

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*Read before the Ontario Medical Association, Niagara Falls, May 1921

No uncomplicated malposition of the uterus should be regarded as a surgical lesion. The uterus does not cause backache, or nervous phenomena, as long as the organ remains natural in size, and normal in mobility. In backward displacements leucorrhœa, with increased menstruation, is almost always present. Permit me here to say a word against an almost universal treatment, carried out usually without any professional advice, that of daily douching. Stop the douching, and the symptoms will usually disappear. Douching does harm in washing away the normal acid secretion; it kills the acid producing bacteria which are the normal inhabitants of the vagina; it kills the superficial layers of cells, and irritates the subjacent layers. It promotes hyperæmia of the parts, and increases the amount of vaginal secretion. Women who douche daily never get rid of their vaginal discharge.

The deciding whether operation will benefit the debilitated poorly nourished woman needs considerable experience and judgment. Will any operation prove beneficent to poor, nervously and muscularly incompetent women, with the intra-abdominal structures in a state of general ptosis? In cases that show general visceroptosis, with large relaxed abdominal walls, operation often results in failure. Treatment here is one of good food, bowel and bladder correction, and the manual replacement of the uterus, followed by the wearing of a suitable pessary.

In deciding what operative measures should be carried out, we must consider the age of the patient, whether married or single, whether within or past the child-bearing period, and the pelvic pathology to be relieved. If definite symptoms are found caused by a retroflexed non-mobile uterus, in a woman who has not borne children, the Baldy-Webster shortening of the round ligaments may be done; in this operation the round ligament of each side is drawn backward through the broad ligament just below the utero-ovarian ligament and sutured to the posterior surface of the uterus, at an area which has been well scarified. The purpose of the procedure is to cause firm adhesions to form between the ligaments and the body of the uterus.

The objection to this Baldy-Webster operation is that the round ligaments are not sufficiently strong to sustain the uterus in its forward position. Were it true that the round ligaments were called upon to sustain the uterus in its position of anteflexion, this objection would be well founded, but this is not true. The function of the round ligaments is merely to draw the fundus in front of an imaginary line, into that position which permits the force of intra-abdominal pressure to be changed into a conservative instead of a destructive force. It is the constantly acting force of intra-abdominal pressure which maintains the uterus in its forward position, and the function of the round ligaments in producing this result, while necessary, is after all of far less importance than the force of intra-abdominal pressure.

The Baldy-Webster operation is essentially the operation of choice during the child-bearing period and should be confined to the uterus relatively normal in size. It is not recommended when the uterus is heavy, as in sub-involution, chronic endometritis, or when neoplastic growth is present. Pregnancy should not take place for at least one year following operation.

In the treatment of uterine prolapse, it is important to secure that result which is best adapted to the exact condition present in the individual case. It is perfectly obvious, that the operation of choice during the child-bearing period would not necessarily hold in a case who had passed the menopause. Also the four common clinical varieties must be considered: (1) prolapse of the anterior vaginal wall, (2) prolapse of the anterior vaginal wall and the uterus, (3) prolapse of both anterior and posterior vaginal walls, (4) complete prolapse of the uterus, with inversion of the vagina, i.e., procidentia.

In the treatment of uterine prolapse, the repair of the relaxed pelvic floor is first attended to. In this we aim to restore the structures which normally form the floor of the bladder, and at the same time to tighten up the relaxed vaginal outlet. A successful perineorrhaphy not only restores the perineal body, but carries the weak place in the pelvic floor forward, out of line of direct pressure, and it further gives the necessary support to the repaired anterior vaginal wall. It is not our purpose in this paper to describe any of the various plastic operations on the vagina, but merely to mention the really important feature of accurately approximating the musculo-fibrous walls, so that one gets a firm broad union in the perineum, and sufficient shortening of the utero-pubic fascial plane to restore the supports of the bladder.

The decision as to what operative treatment shall be carried out within the abdomen, for uterine prolapse, depends largely on whether the function of pregnancy is to be preserved or future pregnancy eliminated. If the uterus is to be preserved for future child-bearing, the restoration of the pelvic support having been attended to, we must maintain the fundus uteri in the anterior part of the pelvis to decrease and neutralize the intra-abdominal pressure.

The uterus of long-standing prolapse is usually abnormally enlarged and heavy. To meet this condition we must devise a technique that will give sufficient support to this increased anterior weight. The patient must be placed in a marked Trendelenberg posture, and, the intestinal coils being well cleared from the pelvis, the utero-sacral ligaments may be first shortened, following the method of Young. In most cases this is only a step in a series of operative procedures, and as it is often difficult to perform, on account of the deep situation in the pelvis, it may be left to the dis cretion of the operator as to whether it is absolutely necessary. In any case it is advisable to shorten the round ligaments. There are several modifications of the Gilliam which will accomplish this. We have found the transperitioneal transplantation of the round ligaments, according to the Crossen technique, to be the most satisfactory. This brings the fundus of the uterus forward, by utilizing the strong proximal portion of the ligament and does not leave a free band in the peritoneal cavity.

In cases where the child-bearing period has passed, or for other reasons is not necessary to be considered, a subtotal hysterectomy with fixation of the pelvic ligaments to the cervix is the most efficient treatment. By this method the tube, and ovarian ligament and the round ligament on each side is united to the corner of the cervical stump. To secure the cervix high in the pelvis, special care must be taken to see that when united to the corner of the cervix the pelvic pedicles are taut.

THE TREATMENT OF IRREPARABLE NERVE INJURIES

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THE experience of the war has proven that end to end suture is the ideal method of treatment of severed nerves. Unfortunately it is not always possible to attain this ideal. Moreover, of those nerves which have been sutured end to end, all do not recover. There exists a group of nerve injuries in which recovery has not taken place. The treatment of these irreparable nerve injuries constitutes a problem with which I propose to deal in this paper.

As indicated above, irreparable nerve injuries fall into two classes, (a) those in which end to end suture has been performed but in which recovery has failed to take place, and (b) those in which it has been impossible to perform end to end suture. If the first group is examined the percentage of failures after suture is found to be rather high. The end results of military cases are being collected, and several series of cases have been reported in current literature. Tinel in his excellent book on Nerve Injuries reports 108 cases with 20 per cent. completely recovered, and 68 per cent. as improved or recovering. It is well known, however, that Tinel placed great stress on distal tingling on percussion as a positive evidence of recovery. Experience has shown that this sign, now commonly known as Tinel's sign, is not always an accurate gauge of recovery. Many sutured nerves recover completely without displaying it, and many cases in which it is present do not recover at all, or recover imperfectly. It is probable, therefore, that, with the lapse of time, his figures will prove to be too optimistic.

Dumas reporting on 115 cases of musculo-spiral injuries, found recovery in 42 per cent. and some regeneration in 23 per cent. more. Presumably the remaining 35 per cent. were failures. Joyce in 1919 reporting on 36 cases, found recovery in 25 per cent., considerable improvement in 16 per cent., some improvement in 25 per cent., and 34 per cent. failures. Forrester-Brown (September 1920) reporting on 158 cases from the Edinburgh War

Hospital, found 28 per cent. complete motor recoveries, and 50 per cent. partial recoveries. The results varied greatly in different nerves as follows: musculo-spiral 62 per cent. complete recoveries, median 50 per cent. complete recoveries, ulnar 17 per cent. complete recoveries. These published results are not in very close accordance with each other and are somewhat difficult of comparison. The outstanding fact is that recoveries average about 50 per cent. The results obtained in Canadian Military Hospitals agree approximately with this figure.

It is reasonable to believe that as we accumulate experience we shall be able to reduce this somewhat discouraging percentage of failures. Experience in this rather special branch of surgery is accumulated but slowly. It is only now, two and a half years after the last wound was sustained, that we are beginning to draw conclusions from nerve injuries sustained during the war.

Of the several factors which contribute to this percentage of failures, one important element is, that these figures relate to war injuries as distinct from civil injuries. The gunshot wound injuring the nerve at the same time produced a relatively large amount of tissue destruction, and sepsis. The resulting scar tissue is a great bar to recovery. Civil nerve injuries after suture recover more certainly, more quickly and more completely than do war injuries. This is evidenced by published results. Sherren in 1908 reported 21 cases of suture with return to power in all. Kennedy in 1918 reporting on a number of civil cases found that 73 per cent. of sutures were completely successful.

It is common knowledge also that the successful outcome of nerve suture is modified by the nerve which is injured. Pure motor nerves, like the musculo-spiral, recover more certainly than do mixed nerves, like the median and ulnar. This must be due to our inability to exactly match the nerve pattern of the segments of mixed nerves, when we suture them together. It is acknowledged that we should exercise every care to perform the suture without axial rotation of the segments, but it is beyond the greatest skill we can exert to prevent some motor fibrils from being shunted down sensory neurilemma sheaths. When this happens a motor fibril terminates in the skin and the motor impulse it conveys finds no muscle tissue to stimulate. Conversely the area of skin to which it goes will be deprived of a path by means of which sensations may be transmitted to the central nervous system. The reverse occurs when a sensory fibril is shunted down a motor path. The muscle then possesses a nerve fibre which is incapable of supplying the necessary stimulus to contraction. Such fibrils are completely lost, as far as function is concerned. If the nerve which is being sutured is a pure motor nerve, particularly if the motor function it performs is a simple and primitive one, like extension of the wrist and fingers, the large majority of proximal fibres cannot fail to find paths leading to muscles, where their stimuli will produce an accustomed result.

Certain of the sutured cases which fail to recover present evidence that the nerve has pulled apart at the site of suture. If examined they present a neuroma at the level of the suture which, when tapped, radiates sensation to the area supplied by the nerve. If the site of suture is re-explored the nerve presents the appearance of a complete severance. There is a bulb upon the proximal segment attached by a strand of scar tissue to the distal segment. A typical case is the following. A patient, who suffered a complete section of his sciatic nerve, had a nerve suture performed two years ago. Recently, when re-examined, he showed no evidence of recovery. There was complete sciatic paralysis below the knee and complete sciatic anæsthesia. In addition there was a point along the course of the nerve at approximately the level of the suture, which, when tapped, radiated sensation to the sciatic area. Upon exploring this nerve it was found that the sections of the nerve had pulled apart and were now united by a bridge of scar tissue only. There was a bulb upon the upper fragment. Faradic stimulation of the exposed nerve produced no muscular contraction. On sectioning the scar tissue bridge, no nerve fibres were found. These only appeared after cutting back the proximal portion of the nerve. The nerve was re-sutured.

This separation of the nerve segments after suture is due to two causes. First, suture under too great tension; second, imperfect fixation of the limb in a position which will prevent tension on the nerve. Both these causes can be prevented. Relatively large gaps in nerves can be overcome by flexion of adjacent joints. This permits end to end suture. The joints however must be kept flexed for an adequate period of time. At the end of six weeks they may be extended a few degrees each week until full extension is reached. This *must* be done slowly in order to prevent the tearing apart of the nerve at the site of suture. If, when attempting a nerve suture, it appears likely that approximation can only be obtained by the use of tension, the bulbs on the nerve segments should be drawn together as closely as possible, adjacent joints being flexed, and the wound should then be closed. After an interval during which the flexed joints have been gradually extended it will be found that the nerve will have stretched, so that suture may now be performed without tension. By means of this device it is possible to overcome a gap of an inch to an inch and a half.

From the examination of a number of sutured nerves which have failed to recover, it appears certain that wrapping the site of suture with fat, Cargile membrane or other material, is a cause of failure. The presence of a sheath of vein, or fat, or fascia, about the site of suture results in increased fibrous tissue formation, and this, by constriction, presents a bar to downgrowth of fibrils. It is much better to displace the sutured nerve into a normal muscle plane than to wrap it with any material.

A rare but interesting obstruction to recovery, of which I have come into contact with two cases, is the occurrence of metaplastic bone between the ends of the nerve segments. The two cases were exactly similar except that in one, the nerve injured was the sciatic, and in the other, the median and ulnar. The history of the latter case is as follows:

Cpl. R. was wounded in the left axilla, entrance through the anterior axillary fold, exit through the apex of the axilla. The wound was a clean, through and through, soft tissue wound, and healed in a few weeks. He presented signs of a complete lesion of the median and ulnar nerves. Six months after his wound the nerve injury was explored by an incision across the insertion of the pectoralis major. The median and ulnar nerves were found completely sectioned and involved in a mass of scar, together with the brachial artery. In the scar was a hard mass like a foreign body. On dissecting the artery free from the scar a small spicule of bone was encountered with a sharp point sticking into the artery wall. There was no bone injury (Fig. 1).

An examination, therefore, of those patients whose nerve injuries have failed to recover after suture, shows several causes for such failures. Some factors, such as the excessive trauma due to war, and the variation in the recoverability of individual nerves, are beyond our control. Some failures could have been prevented by avoiding wrappings of foreign material about the site of suture, or by the prevention of axial rotation of the segments or by the relief of tension on the site of suture.

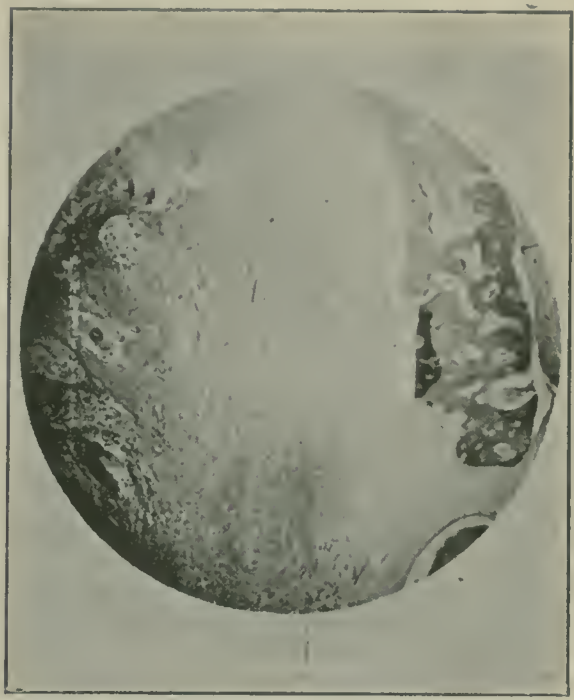

Fig. 1.—Microphotograph of an area of metaplastic bone occurring between the ends of a severed median nerve and obstructing the downgrowth of fibrils.
A.—Scar tissue.
B.—Metaplastic bone.

In those nerves in which it can be demonstrated that the cause of failure is separation of the segments, a re-suture should be performed. This is rational, even if a great length of time has elapsed since the injury. It is probable that the length of time elapsing between the injury and the suture is not so important as we once supposed. The opinion of the British Medical Research Council, as expressed in a pamphlet on "The Diagnosis and Treatment of Peripheral Nerve Injuries," is that "Delay in uniting the ends of a divided nerve does not affect the prospect of success. As far as is known there is no interval of time between the division and union of a nerve, long enough to exclude the possibility of recovery. As good functional results have been obtained from suture performed two or three years after the date of injury, as from primary suture." With this assurance there is added reason why we should re-explore all those cases of nerve suture which have failed to result in recovery.

Apart from the group of nerve injuries which have failed to recover after nerve suture, there exists the second group, in which end to end suture cannot be performed; either because the loss of nerve tissue is excessive, or because ankylosed joints prevent adequate flexion. Many ingenuous operations have been devised to bridge these gaps, such as fascial tubulization, catgut strands, hardened veins and arteries, nerve flaps-cable grafts, and heterogenous grafts. Unfortunately it is a fact that such operations are almost invariably failures. The occasional partial success is too uncertain to justify their use. Stookey collected all the published cases of bridging of gaps by nerve flaps up to 1914. Of 23 cases only two showed any evidence of recovery and in both these the degree of recovery was doubtful. Platt in 1919 published the end results of 18 cases in which grafts had been used to bridge gaps. In the majority of these cases a period of two years or more elapsed since operation. There was no evidence of recovery in any case. Dean Lewis in 1920 reported that in 12 cases in which he had used cable transplants, and in 6 in which he had used tubulization, there was no evidence of recovery. He concludes that either the results obtained experimentally cannot be applied clinically or else our technique is at fault.

It is possible to improve irreparable nerve lesions by tendon transferences. The brilliant results obtained in some situations encourage one to believe their use might be extended. The principle underlying tendon transferences is the detachment of tendons which can be spared from normal muscle groups, and their implantation into the paralysed tendons. With care in the selection of the tendon to be transferred and adequate after treatment, the function of the paralysed tendon is taken over by the transferred tendon. It is not possible to lay down general rules covering all tendon transferences. Each nerve injury requires different treatment.

The most conspicuously successful results have been obtained in the case of musculo-spiral injuries. Here the problem is purely motor. Sensation does not have to be considered, since the sensory area of the musculo-spiral nerve is small and unimportant. Another factor which probably aids in the successful result is the fact that in the fore-arm, movement rather than strength is the important function. There are, also, on the flexor side of the fore-arm, several muscles which may be used for transference without impairing the function of the hand. The pronator teres may be used, leaving the forearm to be pronated by the pronator quadratus. Similarly the flexor carpi radialis, the palmaris longus, and even the flexor carpi ulnaris may be transferred, leaving the wrist to be flexed by the long finger flexors.

The technique of the operation, as performed at the Dominion Orthopædic Hospital, is as follows (Fig. 2):

An elastic tourniquet about the arm produces a bloodless field and greatly facilitates the operation. An incision is made on the radial margin of the forearm along a line extending from the external condyle to the dorsal surface of the base of the thumb. It terminates by a J-shaped curve outwards. Through this incision are exposed and freed, 1st, the tendon of the pronator teres between the supinator longus and the radial extensors of the wrist; 2nd, the tendons of the extensores carpi radialis longus and brevis; 3rd, the three tendons to the thumb, extensor pollicis longus, extensor pollicis brevis, and abductor pollicis longus; and 4th, the extensor digitorum communis. The tendon of the pronator teres is then freed from its attachment to the radius. With a tenotome, the adjacent tendons of the extensores carpi radialis longus and brevis are pierced obliquely in the line of pull of the pronator teres,

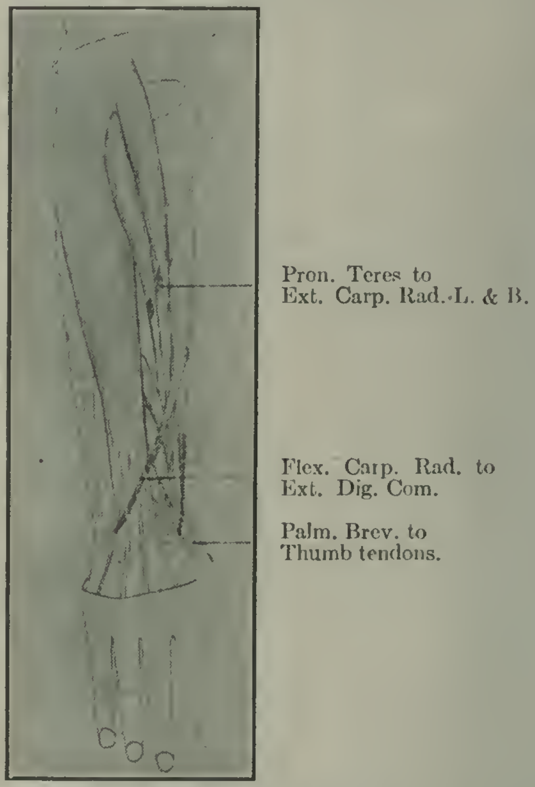

FIG. 2.—Diagram of the operation of tendon transference for irreparable musculospiral injuries.

and the tendon of this muscle is passed through the openings. It is sutured to the tendons of the extensores carpi radialis longus and brevis with interrupted sutures of fine linen; the hand should be well extended during the suturing and the muscles kept under gentle tension. The forearm is then turned over and a median vertical incision made from the wrist to the middle of the forearm. Through this the tendons of the palmaris longus, and flexor carpi radialis are exposed and cut off as low down as possible. A tunnel is then burrowed through the subcutaneous fat from the upper end of the anterior incision to the lower end of the posterior incision. The obliquity of this tunnel should be made to correspond to a line from the internal condyle to the dorsum of the wrist, in order that the line of pull of the transposed muscles may be direct. Through this tunnel the two volar muscles are drawn. The forearm is then pronated and the thumb tendons picked up. These are grouped together in a bundle and pierced by a tentome. Through these openings the tendon of the palmaris longus is passed and sutured with interrupted linen sutures. The thumb should be abducted and extended and the tendons kept under moderate tension. In a similar fashion the tendons of the extensor digitorum longus are pierced obliquely and through the openings the tendon of the flexor carpi radialis is passed and sutured. The line of suture should be such as to permit the transposed muscle to pull in a straight line from its origin to its new insertion. It is important that all the transposed tendons should be scarified and traumatized before suture. Smooth, glistening, unharmed tendons will not unite strongly to each other. They must first be traumatized, in order to stimulate an adequate inflammatory reaction to produce sound union. After suture of the tendons the tourniquet should be removed and all hæmorrhage carefully controlled. The wound is closed by a sub-cutaneous catgut suture only.

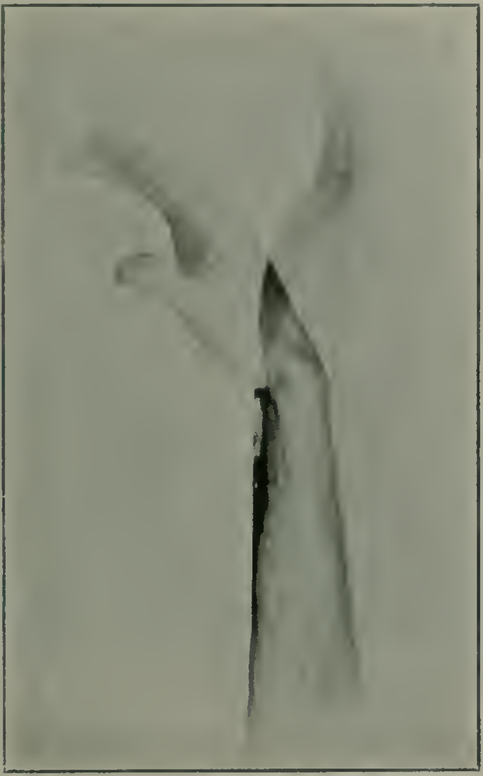

Fig. 3.—Sgt. L.—Range of movement of hand 3 months after tendon transference for irreparable musculospiral injury.

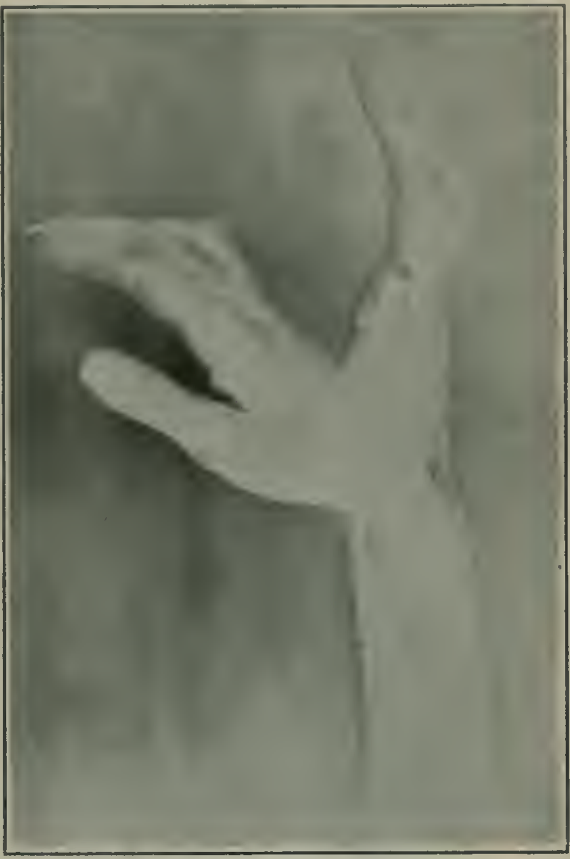

Fig. 4.—Gnr. J.—Range of movement of hand resulting from tendon transference for irreparable musculospiral injury. He has worked for two years as a teamster.

It seems to be of value to leave the fascia unsutured and to place the subcutaneous fat directly down upon the sutured tendons. The hand and forearm are incased in plaster, the hand and fingers well extended and the thumb abducted. It remains in this position for three weeks, and is then released and supported during the period of re-education by a light cock-up splint.

The after treatment is important. After many trials we have abandoned all other methods save the following: Treatment is commenced three weeks after operation. The patient's arm is placed in warm water for fifteen minutes. This is followed by massage and gentle passive movements for half an hour. He then commences the re-education of the transposed muscles under the supervision of a worker. The plan followed is to induce the patient to perform movements which necessitate the contraction of the transposed muscles. He is asked, for instance, to spin a top, to flip a coin, or to play crokinole, in addition to the simpler movements of flexion and extension of the wrist. The usual experience is that for some time the patient is utterly unable to perform any of these movements. After a varying period of time he suddenly learns how to perform a movement and after that it is only a matter of developing strength. He learns the new movement in exactly the same way that an infant learns to perform co-ordinate movements—by trial and failure, repeated continuously, until suddenly the correct method is discovered. Re-education of the patient along anatomical lines, i.e., teaching him the transposed muscles with their old and new function, has not been successful. The brain appears to be concerned with the result rather than with the mechanism of its attainment.

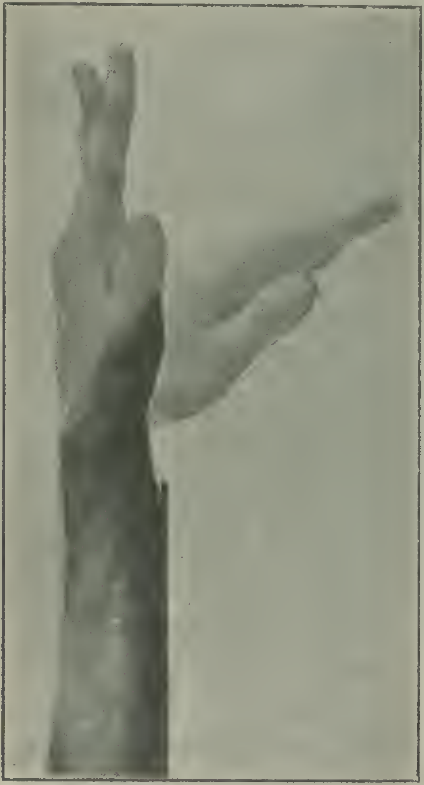

FIG. 5.—Pte. G.—Range of movement of hand resulting from tendon transference for irreparable musculospiral injury.

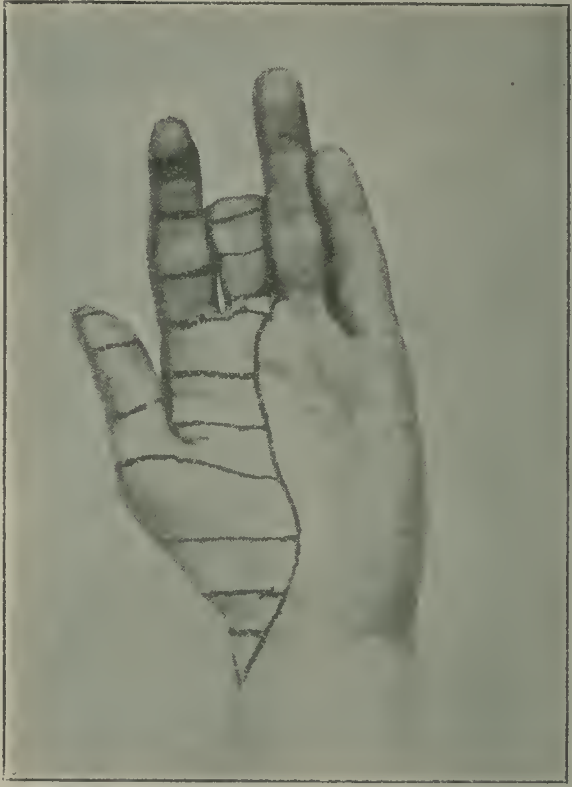

FIG. 6.—Pte. C.—Anastomosis of radial nerve to median nerve for the relief of median anaesthesia. Area of anaesthesia at time of operation.

There are one or two points which must be observed to avoid failure. It is necessary to keep the hand and fingers well hyperextended when performing the transference, and also to suture the tendons under moderate tension. If this is not done, the range of extension will be only fair and will probably not extend beyond the straight line. It seems impossible to hyperextend the hand too much. In suturing, the transferred tendons must be scarified and traumatized sufficiently to produce a moderate inflammatory reaction, without which sound healing will not take place. In two cases, a second operation has shown that the cause of apparent failure was due to slipping of the tendons. This was corrected and a good result obtained in each case.

The results have been extremely gratifying. (Figs. 3, 4, 5). Practically 100 per cent. of the cases have been improved by the operation, most of them very markedly so. Before operation the paralysis of the extensors produces drop wrist and prevents use of the hand because of the lack of fixation of the wrist. The average result obtained by operation is one in which the range of extension of the wrist is restored to about two-thirds normal. The thumb, which before operation was curled into the palm of the hand, can be abducted clear of the flexing fingers. Power is usually subnormal although many of the patients have been able to carry out arduous occupations. One is a teamster, another works on a railway, a third drivesa car. Contrary to expectation, radial deviation does not usually occur, of if it does,to only a slight degree. It is astonishing to see how nearly perfectly the transposed pronator teres replaces the function of the radial extensors of the wrist, especially when one considers that it comes from an antagonistic group of muscles, and from another nerve supply. It is very easy to demonstrate that wrist extension is actually due to the pronator teres, because the belly of this muscle can actually be seen and felt to contract, as extension takes place.

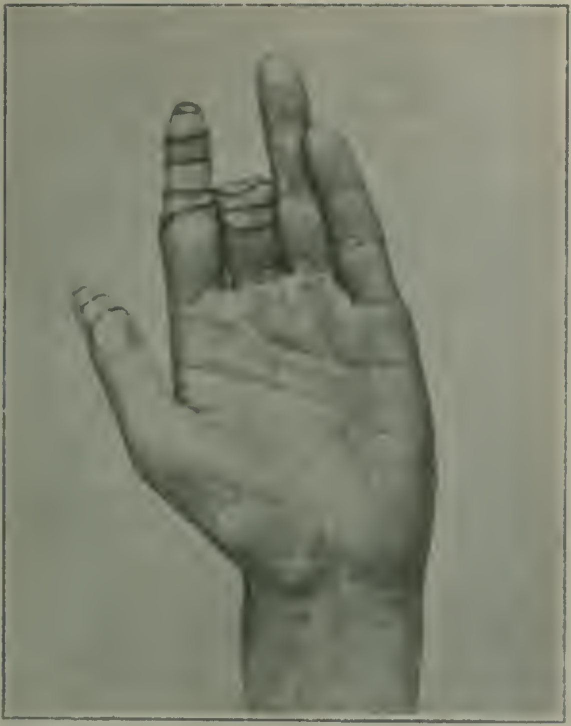

FIG. 7. Pte. C. Area of anaesthesia eight months after operation.

The problem of attempting to relieve a median nerve injury so severe as to be impossible of suture, is very much more difficult. The great obstacle is the fact that there exists anæsthesia as well as paralysis. Moreover it is anæsthesia of an extremely important area. The loss of sensation in the tips of the index and middle fingers and thumb, completely incapacitates the hand. Even if muscle function is good, the anæsthesia will prevent the use of the hand. It is obvious that the primary problem is to relieve the anæsthesia if possible, and then attempt to restore muscle power by appropriate tendon transferences.

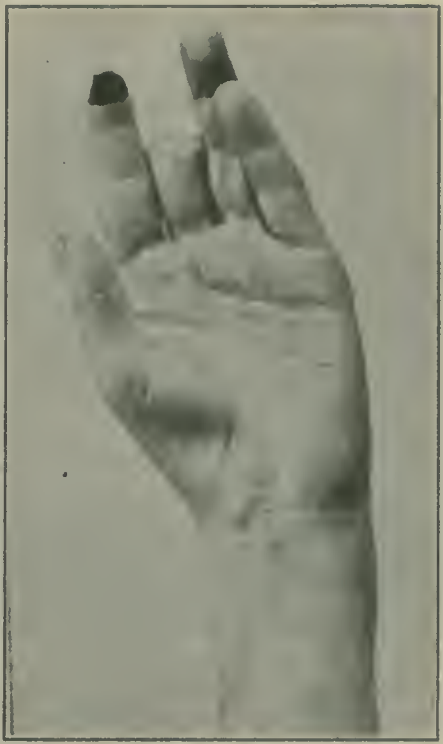

FIG. 8. Pte. C.—Area of anaesthesia eleven months after operation.

In an attempt to solve this problem we have performed an operation, which, so far, has given distinctly encouraging results. In a patient who had a low median injury with so much destruction of the nerve that end to end suture was not possible, an attempt was made to restore sensation by anastomosis of the radial nerve into the median. The operation presented no technical difficulties. The radial nerve was exposed low down and cut off at the level of the base of the thumb. It could well be sacrificed since it only supplies sensation to a small and unimportant area at the base of the thumb. The lower segment of the median was exposed through an anterior incision. A tunnel was made through subcutaneous fat, and after passing the radial nerve through it, end to end suture with the median was performed. Commencing three months after the operation, the median area of anæsthesia to pin prick began to diminish and steadily continued to do so until at the present date there remains only a minute area at the top of the index finger (Figs. 6, 7 and 8). The improvement in this case is sufficiently encouraging to warrant one in hoping the operation may be useful in dealing with similar cases. If it is possible by this means to restore sensation, even though sensation be imperfect, it should not be difficult to improve the paralysis by suitable tendon transferences.

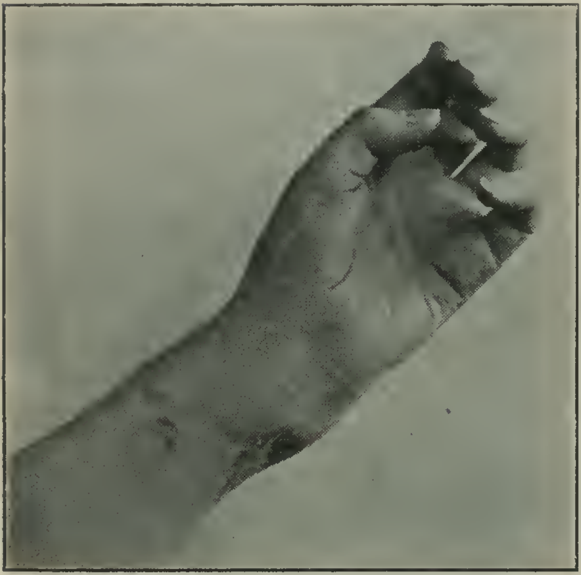

FIG. 9.—Cpl. S.—Tendon transference to restore opposition of thumb. Degree of opposition obtained by implanting half of tendon of flexor pollicis longus into head of 1st. metacarpal.

From the point of view of paralysis and its improvement by tendon transplantation, median nerve injuries may be classified as low and high. In low injuries the injury is below the level of the supply to the muscles in the forearm but above the wrist. In consequence there is paralysis of only the muscles of the ball of the thumb. Of these the most important is the opponens. Not infrequently the superficial head of the flexor pollicis brevis is supplied by the ulnar nerve instead of the median. When such is the case the movement of opposition is retained even though the opponens is paralysed. Tendon transference, therefore, need not be considered. If there is complete loss of opposition, it might be restored by transference of the insertion of the deep head of the flexor pollicis brevis from the inner to the outer sesamoid bone of the thumb (Fig. 9).

In high median injuries the point of injury is above the elbow and there is in consequence paralysis of the muscles of the forearm, in addition to the muscles of the ball of the thumb. Such extensive paralysis presents difficulties. The supinator longus is available, however, and one of the radial extensors could be spared to transplant into the paralysed median tendons. That such a transference is feasible is demonstrated by the following case:

A soldier sustained a gunshot wound of the left forearm which severed his median nerve and radial artery, cut across all the flexor tendons and destroyed his thumb. The thumb was amputated. He had complete loss of power of flexion on the index and middle fingers because of the severance of the flexor tendons. The abductor pollicis longus, now of no use because of the loss of the thumb, was freed and transplanted into the tendons of the flexor digitorum sublimis. In a comparatively short time he regained the power of flexing his fingers (Fig. 10).

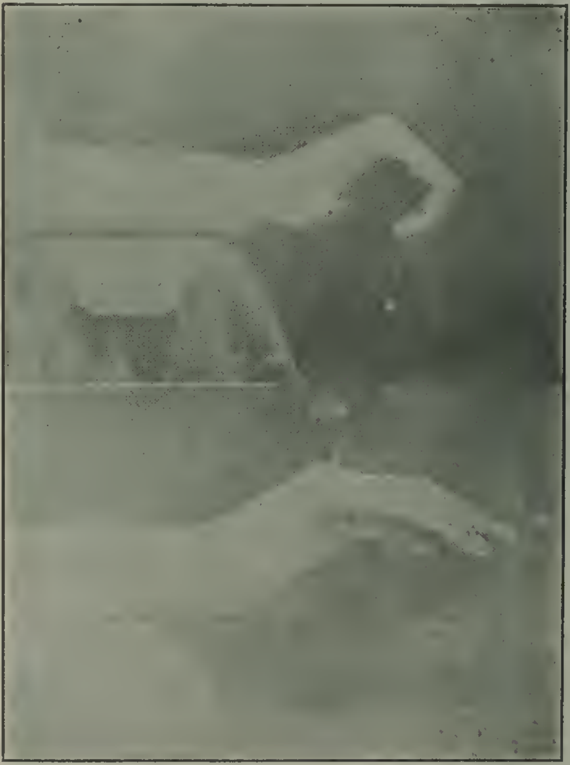

FIG. 10.—Pte. H.—Tendon transference to restore flexion of fingers. Range of flexion 6 months after operation.

The problem of restoring function to the ulnar nerve is more difficult. On the other hand an ulnar lesion is not so disabling as section of either the median or musculo-spiral nerves. The paralysis of the numerous small muscles of the hand incapacitates the patient from the performance of fine movements of the fingers. Gross muscular movements of the arm and hand are interfered with but little. The disability is much greater for a professional man than for a laborer. The anæsthesia of the ring and little finger is usually not of serious importance The ring finger often becomes markedly contracted and flexed into the palm so that it interferes with work Amputation is indicated in such a case.

The function of the leg is such that tendon transferences do not give such satisfactory results as stabilizing operations. This results from the fact that the chief function of the leg is weight bearing, in contradistinction to the chief function of the hand and arm, which is co-ordinate movement. Tendon transferences, when successful, restore movement, but usually strength is subnormal. They can produce a functionally useful arm, but in the leg stable strength is needed more than movement or delicacy of co-ordination. In the case of unrecovered sciatic lesions the indications are, therefore, to stabilize the foot rather than attempt to restore its movement by tendon transferences.

Fortunately there are few cases of injury to the sciatic between the knee and the hip in which it is not possible to secure end to end suture. The great length of nerve which can be freed and the large gaps which can be bridged by flexion of the knee and extension of the hip, make it unusual to find a gap too large to bridge. Permanent sciatic cases presenting themselves for treatment are, therefore, mostly cases which have already been sutured. Some of them undoubtedly have failed to recover because the segments of the nerve have pulled apart at the site of suture. In such cases re-suture is indicated, with care to prevent tension upon the site of suture after operation. A plaster spica with the knee flexed and the hip extended, is the most satisfactory means of providing fixation.

Even when there exists a complete sciatic lesion which has not shown signs of recovery, it is surprising how well function of the leg is retained. Such patients use their leg and walk very well. They are subject to pressure ulcers, so called "trophic." These can be avoided with care. Those patients who regularly examine their anæsthetic feet and take pains to see that points of pressure are relieved, have very little trouble with ulcers, while heedless patients have repeated ulcers. All voluntary movements of the foot are completely lost, but because of the very fact that all muscle groups are paralysed, the foot is not pulled into a deformed position by unbalanced muscle groups. As the paralysed and atrophic muscles fibrose, the tendency to dangle foot becomes less.

When the paralysis is incomplete there is much greater tendency to deformity because of the unbalanced muscle pull. In such cases a suitable tendon fixation will correct the deformity and prevent the necessity of wearing an appliance. If the anterior tibials and peroneals are paralysed, and the foot is in paralytic equino-varus, the deformity may be corrected by fixation of the tibialis anterior to the tibia, and the peroneals to the fibula. It is important in performing this operation that the tendon be very thoroughly scarified and traumatized and placed in firm contact with bare bone. Only by this means can union take place, of sufficient firmness to maintain the foot in the correct position against the pull of normal muscles. The deformity must be well corrected during the operation, and the tendons must be sutured under moderate tension. All strain on the site of suture after operation must be prevented by an adequate plaster. Properly performed fixations have given very satisfactory results. They improve the gait and do away with the necessity of wearing a splint.

Summarizing our experiences with irreparable nerve injuries, we may draw the following conclusions:

1. A group of nerve injuries exist to which the term "irreparable" may well be given, since they consist of:

(a) Sutured nerves which have failed to recover.

(b) Nerve injuries which cannot be sutured end to end.

2. A few cases in the first group have resulted from imperfect suture. Such cases should be re-explored and re-sutured if possible.

3. The remaining cases must be treated by secondary operations such as tendon transferences and tendon fixations.

4. Irreparable musculo-spiral injuries can be greatly improved by tendon transference.

5. Irreparable median lesions may be improved by nerve anastomosis to relieve anæsthesia, and tendon transference to overcome paralysis.

6. Irreparable sciatic lesions are better treated by means of stabilizing operations such as tendon fixation, than by tendon transferences.

I am indebted to Dr. W. E. Gallie for notes and specimen of the cases of bone meta plasia.

THE SURGICAL TREATMENT OF GASTRIC AND DUODENAL ULCER*

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BEFORE entering upon my part of this afternoon's discussion I want to say how much I have profited by what has already been said on this old and eternally new topic. Without making any invidious distinctions, I want particularly to express my appreciation of what Dr. Sippy has done by his persistence in stimulating the study of this important subject. There is no doubt that the use of his method before and after surgical treatment has greatly enhanced the good results obtained from surgery. In fact, as Dr. Charles Mayo has recently said, the surgical treatment of ulcer is the best recognition of the medical treatment, inasmuch as it permanently overcomes delay or obstruction and reduces acidity with the patient's own alkalies.

In addition to the value of medical treatment before and after operation for ulcer, especially after, it is pre-eminently the best course to pursue in the care of acute ulcer; but for the old sinner, the chronic ulcer, the old ulcer, I think medical treatment is only encouraging an overt act, such as acute perforation (which in my experience occurs in twenty per cent. of cases) carcinoma, and hæmorrhage.

In the surgery of duodenal and gastric ulcer the most desirable thing, of course, is, wherever possible, to excise the ulcer. Conditions permitting, this should always be done either with the knife or the cautery. When the ulcer is small and the mechanism of the stomach has not been seriously disturbed, excision alone may suffice. This however is rarely the case, probably owing to the pronounced chronicity of nearly all duodenal and gastric ulcers that come to operation, a chronicity in large measure due to prolonged unsuccessful medical treatment. It is a remarkable fact that the average duration of symptoms in my experience is about nine years or more. This is also the experience of the Mayo Clinic and of other centres where large numbers of these ulcers are treated. Since, therefore, few small ulcers are encountered something else must be done to correct the conditions leading to and resulting from the ulceration. This in most instances is effectually accomplished by the operation of gastroenterostomy where there is cicatricial contraction and obstruction of the pylorus. This anastomosis, in its present day perfection, is on the whole satisfactory both as to immediate, interval or end-results.

Coffey makes the statement that gastroenterostomy alone is the best procedure in the treatment of these ulcers. To this I cannot agree. It is questionable how much good gastroenterostomy does in the absence of pyloric obstruction and in the presence of gastric ulcer distal to the pylorus. In the latter instance, to obtain the best results, excision of the ulcer alone, or, if this is not feasible, pylorectomy, subtotal gastrectomy, or circular resection with, as a matter of course, gastroenterostomy, are the procedures of choice. It has been my experience in circular resection for ulcer upon the lesser curvature that with few exceptions is a gastroenterostomy necessary. In a number of circular resections which I have been able to follow, in only one of which have I made a gastroenterostomy, the results have been most satisfactory. If this is true it will be admitted that the operative procedure is simplified. In subtotal gastrectomy, when the stomach is sectioned well to the cardiac end, the Polza operation as modified by Balfour has a useful field. However, there seems to be a tendency at this time to return to the localized treatment as represented by Finney's operation of pyloroplasty. The advocates of this procedure claim that in its actual effects the result is the same as the most radical operation. In other words, the ulceration being the cause and not the result of hyperacidity and hypersecretion, excision of the ulcer removes the local condition, while the pyloroplasty provides for a greater rapidity in the emptying time of the stomach, thus preventing hyperacidity, and moreover leaves the normal relations of the stomach and duodenum intact. The operation is also considered a simpler and less time-consuming one than gastroenterostomy, though this I believe is entirely a matter of personality which need not be considered here. The conservative nature of the procedure is, of course, greatly in its favor, and taking a so-called ulcer diathesis for granted (that is hyperacidity once established is apt to continue or recur) it is a rational one. But it must be remembered that only about fifty per cent. of cases of gastric and duodenal ulcers present a marked increased acidity before operation.

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*Read before the Ontario Medical Association, Niagara Falls, Can., June, 1921.

In contrast to this there seems to be a growing tendency, particularly among European surgeons to resort more and more to radical operation, especially in the treatment of gastric ulcer. No less an authority than Sir Berkeley Moynihan advocates partial gastrectomy as the best surgical treatment for gastric ulcers. The disease, it is generally agreed, is more serious than duodenal ulcer and in view of its inherent possibilities, especially the degeneration into carcinoma, requires "more direct and radical treatment" than is provided by a gastroenterostomy, which he believes, whether its action be physiological or mechanical, "merely produces a condition of things in which healing can more easily take place." Sir Berkeley questions the value of reducing gastric acidity, since, as he puts it, the natural environment of the gastric cell is an acid medium in which it is born, functionates and perishes. The influence of neutralization, is, to say the least, conjectural, and furthermore we do not know whether it is this alone or a combination of circumstances in the treatment that produces the cure. Since 1909 he has performed 96 gastrectomies with 2 deaths, or a mortality of 2.8 per cent., an enviable record which few can hope to equal. During the same period I have used partial gastrectomy on 185 cases with 8 deaths, or 4.32 per cent. mortality. The important thing in choosing the procedure is a proper selection of cases, for these patients with gastric ulcer are usually in a much more depleted condition than those whose symptoms point more or less definitely to duodenal ulcer. Selection then, here more perhaps than elsewhere, is an important factor in securing at least satisfactory immediate results. Among German surgeons also, based on their war experiences, radical operation appears to be the choice. In fact, Finsterer believes partial gastrectomy to be the suitable procedure not only for gastric but for duodenal ulcers as well, the best results being obtained by resection of at least one-half of the stomach. Not only that, but he does not find it necessary in all cases to excise the ulcer, ? if, instead of unilateral exclusion one-half or two-thirds of the stomach is resected and the distal gastric lumen is securely closed in front of the pylorus, followed by an end-to-end anastomosis between the partially sutured proximal lumen and the first loop of the jejunum. In Sir Berkeley's experience no recurrence of ulcer took place after the radical operation, which of course also speaks well for the procedure.

In a recent discussion on the treatment of gastric and duodenal ulcers at a meeting of the County Medical Society of Philadelphia (May 25, 1920) I was able to report about 90 per cent. of cures in cases traced for a period of two or three years after operation. In the vast majority of these, in addition to the excision of the ulcer, gastroenterostomy was performed. It is not so much the change in motor activity as in the chemistry of the stomach produced by the operation on which its favorable results depend. Physiologists have demonstrated that there is mainly a reflux of alkaline juices which may continue for several years after the operation, and which interrupts peptic digestion, while protein digestion is taken over by the trypsin in the back-flowing pancreatic juice. These secretions so well substitute the lowered gastric digestion that total metabolism of nitrogen, carbohydrates and fats is little altered by the operation of gastroenterostomy. This entirely accords with the observation that ulcers distal to the pylorus heal with much greater difficulty than those close to the pylorus, since the intestinal fluid hardly reaches all parts of the stomach; at the same time it represents an argument in favor of radical operation in the former type of ulcer. But even when doing a subtotal gastrectomy or a circular resection, I have not found the addition of a gastroenterostomy to give more satisfactory results than when the operation is completed without making the anastomosis, especially in the cases which before operation gave evidence of pronounced hyperacidity and hyperactivity. The fact of the matter is that no single operation is applicable to all types of cases nor even to all cases of the same type. There are so many factors, subjective and objective, to be taken into consideration that the decision what to do cannot be made before operation, and even at the operating table, careful consideration is essential, and even though it means quick thinking it must not imply hasty judgment.

A CLINICAL STUDY OF THE PATHOLOGY OF OSTEOMYELITIS

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CONSIDERABLE attention has been devoted of late to the subject of osteomyelitis, but there are several aspects of the problem that do not yet seem to be clear. On the one hand it is emphasized that inflammation of bone follows the same lines as inflammation of the soft tissues while on the other hand it is equally important to emphasize that the results of the process are modified by the nature of the tissue in which it occurs. Bone is a tissue that is unfitted by its structure to make a rapid reaction to an acute infection, but it is also a tissue in which the reaction, if efficiently made, may be extremely thorough from the standpoint of defence, but very inadequate from the standpoint of a successful offensive.

It is not sufficiently realized that there are two distinct types of osteomyelitis, which may be distinguished as the juvenile and adult types. The first class comprises cases where the onset of the attack occurs during the growing period, when epiphyses are still present. The second class includes all cases occurring after development of the bony skeleton is complete. Characteristic of the first group is the fact that it practically always occurs—if the lesion be a primary one—on the diaphyseal side of the epiphyseal cartilage, the so-called metaphysis. Characteristic of the adult type is its appearance at any part of any bone. The juvenile type is also characterized by variability in intensity: some cases are fulminating, leading to death of the patient in twenty-four hours; others are of indefinite duration. Cases of the adult type are practically never fulminating and are generally less acute in their course. Considerable controversy has been waged anent the question of a primary periosteal inflammation versus a primary osteomyelitis. Here again the differentiation of type is of some value. In the juvenile variety the infection is almost invariably an osteomyelitis with periostitis secondary. In the adult type a primary periostitis may be met. In bones devoid of an epiphysis, such as the carpal and most of the tarsal bones, infection may occur at any part of the bone. The striking predilection for the metaphysis was brought home to me by a case which I saw in 1912. A boy aged about 12 was brought in evidently acutely ill with marked swelling, redness and tenderness in the left clavicular area. The region was opened up at once, but no lesion was discovered. Next day the patient died and a post mortem failed to reveal a cause for the condition until the muscles were dissected from the scapula, when a small abscess about the size of a pea was discovered at the root of the coracoid process of the scapula. The coracoid process ossifies from a main centre which appears during the first year of life and joins the body of the scapula about the fifteenth year. Such a case might have been diagnosed before operation had one kept clearly in mind the fact that the coracoid is an epiphysis, and that primary osteomyelitis in children attacks the metaphysis.

One is accustomed to think of osteomyelitis as essentially a disease of children, with no obvious preceding cause apart from a slight injury. I have therefore collected and analysed the cases occurring in our private practice only, during the last few years. Omission has been made of all military cases due to gunshot wound. There are 48 cases, and unfortunately the records are not complete in respect of a good many details.

The average age at which the patient came or was brought—for consultation was 23 years. The average age of onset of the disease was 17. The youngest was 7½ months, the oldest 64. In the case of one patient the disease had existed from the age of seven, and had remained practically quiescent until the age of 45. As regards the bone affected, of 59 bones affected in the 48 cases, the tibia accounted for 23, the femur for 20, the humerus for 8, the lower jaw 1, first metatarsal 1, ulna 2, middle cuneiform 1, ilium 1.

vertebræ 1, phalanx 1. In one patient four bones were affected, namely, right humerus, left humerus, left femur, left tibia. There is thus shewn a marked predisposition to affect the bones of the lower limb. In the case of the femur, the right was affected nine times, as against eight infections of the left side. In the case of the tibia, there were 15 left as against eight right tibiæ affected. This is certainly associated with the greater liability to trauma in the case of the lower extremity. As regards etiology, 24 cases could shew no direct exciting cause, while a number displayed very clearly an antecedent factor.

Causation:

1	Unknown...	24
2	Trauma....	6
3	Penetrating wound	3
4	Influenza........	2
5	Pneumonia......	2
6	Physical strain and chill.	2
7	Carbuncle	1
8	Septic tooth..........	1
9	Tonsilitis.... ..	1
10	Scratch on foot (tibia).	1
11	Mastoid......	1
12	Puerperal sepsis	1
13	B. Coli......	1
14	Typhoid fever (?)	1
15	Rheumatism	1
		48

Ten cases shewed recurrence in another bone of the body at a later period as shewn:

	Name	First Bone Affected	Other Bones Affected	Interval
1	D.C.	right humerus	2nd and 3rd lumbar vertebræ, right femur	10 years
2	W.E.	right femur	left tibia	15 years
3	M.F.	left tibia	right humerus	?
4	T.H.G.	left tibia	right sterno-clavicular joint	3 months
5	F.L.	left humerus	left tibia, right femur	1 year 2 years
6	M.	both femora	left humerus	26 years
7	A.N.	left tibia	phalanx of finger	2 years
8	I.P.	right tibia, left foot	left humerus	3 years
9	J.F.McA.	right tibia	right fibula	13 years
10	G.B.	left tibia	right humerus	4½ years

In regard to mortality five deaths are recorded in the series:

	Sex	Age	Bone	Cause of Death
1	F.	7	right femur	empyema
2	M.	30	left tibia	influenza
3	M.	7	right femur	B. coli infection
4	F.	child	left tibia	pus in knee joint, death in 3 days
5	M	64	left femur	shock

Of these the first and fourth are distinctly associated with the osteomyelitis. In the second case, the influenza was an intercurrent affection. The third case was moribund when seen, a large B. coli abscess being present in the right thigh, the patient having been under observation by a medical man for a good many weeks. The head of the femur was necrotic The fourth case alone is of the fulminating type, representing a very acute infection in which the patient was doomed from the first. The fifth case is detailed later.

In regard to duration of treatment, it is impossible to furnish figures even approximately accurate. The primary lesion usually can be healed in a time which is generally reckoned in months, but if one regards as incompletely treated any case which returns with local recurrence, then in many instances the treatment lasts years. Again, statistics of duration of treatment are misleading inasmuch as every fulminating case leading to death would improve one's statistics enormously. The general result of enquiry regarding this point is that treatment is a very prolonged process, so prolonged indeed that one cannot be satisfied with the results.

In considering the pathological anatomy of osteomyelitis, one must consider, separately to some extent, the juvenile and the adult types. Common to both varieties is the presence of organisms, and when once the process of infection is well established, there is no essential difference. In determining the site of incidence one is struck by the overwhelming number of juvenile cases which are juxta-epiphyseal. If a fresh young bone be taken and sufficient force be applied to separate the epiphysis, the epiphyseal cartilage comes with the epiphysis. In other words, a strain is taken up by the tissue, on the diaphyseal side of the epiphyseal plate, i.e., the metaphysis. Here then is the region where small hæmorrhages are apt to occur, where the vague changes grouped as devitalization of tissue resulting from blows or twisting stresses are likely to be present in young bones. Looked at from a pathological standpoint the metaphysis is the region of a long bone, most likely to provide a nidus for organisms. A further point deserves notice. The observations of Lexer on the blood supply of bones shewed that the nutrient artery after bifurcating passes in multiplying branches toward the epiphyseal cartilage; these fine twigs terminating at the metaphysis in abrupt hair-pin bends. This, then is the region where the blood stream is likely to be slowest, and in consequence a suitable region for organisms to fall out of the stream. We thus have in the metaphyseal region a two-fold chance of infection: (a) the invader; (b) the region invaded. It is not, therefore, surprising that infection occurs somewhat frequently. In adult cases, owing to the absence of the two factors mentioned, the site of infection may be anywhere in the bone.

Now, let us suppose that infection has occurred, what are the possibilities? It is useful to think of the process in military terms.

1. The invader may overwhelm the defender. This corresponds to the fulminating case.

2. The defender may overwhelm the invader. Strictly speaking these cases are not true osteomyelitis. They are the no doubt frequent abortive cases.

3. An equilibrium may be established between invader and defender, a species of trench warfare where after the initial onslaught the host can hold the invader at bay, but cannot annilhilate him. This corresponds to the case where the pus which is formed is either spontaneously or surgically evacuated, but the condition does not clear up.

4. The defender may surround the invader, with an impenetrable wall, thus limiting his activity although unable to annihilate his forces. This is the case of the circumscribed bone abscess or Brodie's Abscess.

In the first two cases the contest is short and sharp, the casualties being 100 per cent. on alternate sides. The losses of the host in the second case may be described as molecular death of bone, invisible to the naked eye. The third and fourth groups of cases are the most frequently encountered. Here the losses of the host are larger, visible to the naked eye, resulting in the formation of a sequestrum. Death of bone occurs more readily than death of soft parts, probably mainly because the blood vessels being encased in bony tubes are less susceptible to dilatation and thus reinforcements cannot be rushed to the scene of action so speedily as in the case of soft tissues. Hence, a line of defence is constructed at a point somewhat remote from the scene of the conflict. The bone is rendered denser, heavier, more resistant to penetration by the organisms or in pathological terminology, "sclerosed." If the zone of defence be sufficiently near to the scene of the fight we have the typical spheroidal bone abscess. If this spheroidal defence be impossible owing to the amount of bone killed at the original onslaught, we have the typical clinical picture associated with the osteomyelitis of adolescence.

This accounts for the two varieties of sequestrum the molecular, which being small is easily dealt with by the osteoclastic scavengers, and the massive, where the process of cleaning up may be extremely prolonged; indeed if surgical aid be not invoked it may last almost indefinitely. There is a third variety of sequestrum which is much less common and which we have called the "lining" sequestrum. This has been found in long bones which are the seat of a chronic osteomyelitis. After the medullary cavity has been opened into, the interior of the shaft is found to be lined by a thin tube of dead white bone, densely hard but easily separable from the underlying compact bone with a mastoid chise . This lining sequestrum may extend for a variable distance throughout the shaft of the bone In one case such a lining sequestrum was observed in both humeri and one femur, extending the ull length of the shaft, necessitating each bone being laid open from proximal to distal extremity The explanation of this condition is not very clear. It seems to suggest a primary bone marrow infection with death from toxin of the tube of bone surrounding the marrow.

How long may the organisms exist beleaguered in a bone abscess? As far as we know, they may remain almost indefinitely. One case, aged 24, had a bone abscess in the lower end of the left femur, dating from an attack of typhoid fever at the age of 12. In another case where the abscess was almost but not completely circumscribed it remained closed from the age of seven till the age of 45, a period of 38 years. When organisms are thus enclosed for a prolonged period their pathogenicity seems to become lowered and the abscess is either sterile or tenanted by organisms of low virulence, so that treatment can be modified accordingly.

In regard to prognosis, the study of the cases referred to makes a guarded prognosis essential in respect of both the immediate and the ultimate outlook. The condition is always a serious one. Recovery from the primary attack is almost certain to be a tardy process, and the danger of recurence either local or remote is considerable.

No.	Name	Age	Sex	Onset Age	Cause	Primary Bone	Bone of Recurrence	Remarks
9	G.W.A.	13½	M.	12½	influenza	left humerus		
2	H.R.B.	28	M.	28	trauma and chill	right tibia		amputation
3	V.B.	9	M.	8½	septic tooth	lower jaw		
4	A.B.	16	M.	16	?	left femur		
5	L.B.	9	M.	8	?	first left metatarsal		
6	D.C.	22	M.	7	pneumonia	right humerus	2nd and 3rd left vert. head of right femur	
7	K.C.		M.		?	left femur		
8	F.B.C.	26	M.	25	trauma	right ulna		
9	C.C.	24	M.	23	penetrating wound	right ulna		
10	C.	24	F.	12	B. typhosus wound	left femur		bone abscess
11	E.R.D.	41	M.	11	trauma ?	right, left femur		accompd. by polyarthritis
12	W.E.	19	F.	?	trauma ?	right femur	left tibia	
13	W.F.	?	M.	?	penetrating wound	left tibia		local recurrence later
14	J.F.	10	M.	10	?	left tibia		
15	M.F.	20	M.	16	strain	left tibia	right humerus	
16	J.G.	47	F.	7	?	left tibia		bone abscess reopened after 38 years
17	M.G.	7	F.	7	pneumococcus	right femur		empyema, death
18	R.J.G.	43	M.	13	trauma and chill	middle cuneiform		
19	T.H.G.	30	M.	28	tonsilitis	left tibia	r. sterno-clavicular joint	death, influenza
20	W.R.G.	16	M.	16	influenza	left tibia		
21	S.H.		M.		?	left tibia		
22	G.H.	8-12	M.	7-12	?	right humerus		
23	R.K.		M.		carbuncle	left tibia		
24	E.L.	30	M.	16	?	left femur		onset 1906; local recurrence 1910, 1913, 1918, 1920
25	F.L.	16	M.	14	?	left humerus	left tibia (2) right femur (2)	
26	H.H.M.	32	F.	18	?	right femur		bone abscess, rt. gt. trochanter
27	J.F.McA.	26	M.	12	?	right tibia	right fibula	amputation advised; has had many operations;
28	Mo.	44	M.	44	B. coli	right femur		death.
29	Mu.	38	F.	12	?	right femur		large black sequestrum removed after 26 years.
30	Mi.	41	M.	11	?	both femora	left humerus	recurrence 25 years later
31	Ma.	30	M.	30	?	Left femur		bone abscess
32	D.N.	7	F.	4	scratch on foot	left tibia	l. index, 1st phal.	
33	P.O.	40	M.	39	?	right tibia		
34	E.P.		F.		?	left tibia	pus in knee	death in 3 days
35	I.P.	16	M.	13	rheumatism	left foot, rt. tibia	left humerus, rt. tibia	
36	S.R.	22	M.	9	cold ?	right tibia		bone abscess; removed. healed in 9 years.
37	Mrs. R.	32	F.	26	mastoid	left humerus, rt. humerus, l. femur, l. tibia		lining sequestra
38	Sl.	15	M.	12½	?	right femur		
39	St.	9	M.		?	right femur		
40	F.T.	14	M.	14	trauma	right humerus		
41	L.T.	17	M.	14	left tibia	left tibia		
42	W.T.					left tibia	left tibia	local recurrence 32 years later procured him pension
43	Mrs. T.	24	F.	24	puerperal infection	left tibia, l. ilium		
44	E.T.	5½	F.	3	?	right tibia		bone abscess
45	H.C.	45	M.	44	compound fracture	right tibia		still under treatment
46	H.E.H.	23	M.	15	trauma	right femur		5 previous operations
47	G.B.	12	F.	8	?	left tibia	right humerus	small sequestrum
48	W P.R	64	M.	14	trauma and exposure	left femur		death

Two cases may be cited in a more detailed manner:

1. G. B., female, aged 12, was seen first on July 8, 1916, at the age of eight. Three days before this she had developed pain just below the left knee. The left leg was opened up, pus being present beneath the periosteum throughout the whole length of the tibial shaft, and between the muscle planes. The whole shaft of the tibia seemed to be dead, and the wound was left open. The condition grew steadily worse. On August 9, 1916, pus was aspirated from the knee joint, a staphylococcus was cultured from the blood and amputation above the knee decided upon as an extreme measure. Two months later the child was able to leave hospital.

In April, 1917, an abscess formed on the stump. It was incised, and healed rapidly.

In January, 1918, a small sequestrum was discharged from the stump.

On December 29, 1920, she reported with a small swelling on the postero-lateral aspect of the right arm just below the axilla. It had been noticed for about one month and seemed to be increasing slowly. An x-ray showed "a small shadow apparently bone or calcareous deposit about the centre of the tumour."

On January 19, 1921, it was decided to explore the "tumour." "It was found to contain a small quantity of pus, a specimen of which was taken for culture, and also a thin shell of sequestrum showed pure culture of staphylococcus aureus."

2. W. P. R., male, aged 64, Broker.

First attack occurred in 1870 at age of 14. Patient was pitching sheaves, the end of the fork resting on the lower end of the left thigh. There was coincident history of exposure to cold and wet. No operation was performed, spontaneous evacuation of pus from the lower end of the left femur occurring. From this time onwards he was lame, using a cane, and always when he became run down generally the wound would break down and discharge.

In 1896 he had an extensive operation undertaken with a view to clearing the condition finally. The wound healed after a year, and remained healed until 1908. At this time he had a very severe illness complicated by jaundice and hiccough for two weeks. Amputation was performed at this time at the mid-thigh level. Recovery after operation was slow; for about eight months he had many subcutaneous abscesses, one of which over the right sacral region discharged for one year. After completion of convalescence he was untroubled until April, 1920. At this time he had a good deal of throbbing and pain in the stump, particularly at night. On April 27th it was found necessary to open up the stump. "As soon as the skin was opened, pus spurted out; pus was found oozing from the lower end of the bone. About an inch of the stump was removed with the chisel, a curette was introduced into the medullary cavity and passed up for about six inches." Patient's condition was not improving, and on May 8 disarticulation at the left hip joint was performed. Pus was found in the hip joint. Patient suffered very severely from shock and died about 24 hours later.

These two histories serve to illustrate that a bone infection once incurred is seldom got rid of with certainty. Once an attack of osteo-myelitis has occurred the organisms can entrench themselves and lie latent for years. If there be a local or a general diminution of resistance there is always a possibility of their irruption.

BASIS OF INTRACARDIAC INJECTIONS FOR RESUSCITATION

VOGT distinguishes three forms of intracardiac injection: (1) intrapericardial; (2) intramyocardial, and (3) intraventricular, and says that intraventricular injections are the most effective. He discusses the surgical indications for such injections. They must be given within ten minutes after cardiac standstill. In most of the successful cases they were given within five minutes after respiratory standstill. If the injection is not given promptly, the more sensitive cerebrum cannot recover even though it should be possible to restore the heart beat. Camphor, caffein, and digitalis preparations do not have a strong enough effect, and may injure the heart tissues. Strophanthin has many good features, but one great disadvantage is that if by accident it is injected intramuscularly, the myocardium may be badly damaged, for which reason Vogt rejects strophanthin. He states that even Frankel, who introduced it into therapeutics, warns against its intracardiac use, while van den Velden, to whom we owe the idea of intracardiac injections, has given up its use entirely. Preparations of the suprarenal glands are the best remedies; their effect is often little short of miraculous. The maximal dose of 1 c.mm. must not be surpassed. Especial caution is needed in the presence of high blood pressure. Preparations of the pituitary gland are almost as effective as epinephrin, and do not necessitate quite the same caution in administration. A mixture of the two has been tried, but it remains to be seen whether there is any advantage in the combination. —*Jour. A.M.A.*, Aug. 27, 1921.

SYPHILIS, ITS RELATION TO INFANT MORTALITY AND CHILD WELFARE, WITH A DISCUSSION OF PRESENT DAY METHODS FOR ITS CONTROL*

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Any discussion or statistical survey pertaining to the relation of syphilis to infant mortality would fall woefully short of complete thoroughness and would fail altogether to achieve the desired object—namely, the demonstration of the social and economic loss to the nation resulting from this disease—were it to include only the infant deaths due to syphilis. In order to reach a more accurate conception of the seriousness of the problem I have taken the liberty of using the term infant mortality in a broader application than is customary, and have made it include as well the prenatal destruction of the products of conception. As a matter of fact it is the prenatal ravages of this disease which are the most disastrous. All of us who have been interested in the problem of reconstruction following the war have realized the supreme importance of the conservation of the infant life and we all recognize the ultimate effect on the birth rate of the loss of thousands of Canada's manhood in the war, but how many of us have given more than a passing thought to the birth-rate problem? Added to this there is the universal tendency amongst the married to shirk the expense and responsibilities of parenthood. The present high cost of living is mainly responsible for this state of affairs. To quote actual figures: the birth rate in Toronto dropped from 29.7 per 1000 population in 1914 to 22 6 per 1000 in 1919, and a similar decline was evidenced in the provincial figures. The depletion by war in the number of the country s young men and the high cost of living are factors over which we have no control, but these are by no means the only factors operating in the production of a lowered birth-rate.

Another and a very important one is syphilis, and this one we are at present capable of controlling, and in the future I hope will control. Just how important it is, is very difficult to put into figures, but an approximate estimate can be made.

In 1920 there were 13,300 births recorded in Toronto and 675 still births It will be observed that the still-births are approximately 5 per cent. of the live births—a proportion that is fairly constant in every country (1). Few figures of any help in arriving at an estimate of the number of miscarriages are available. They are probably twice as numerous as still births, or 10 per cent. of the total live births—a conservative estimate. The total therefore, for miscarriages and still-births is 15 per cent. of the live births. That this figure cannot be very far astray is shown by statistics given by Adair (2). Of 2773 pregnancies 2422 ended at term and 351 or 14.5 per cent. terminated prematurely. Schwartz (10) found that in 27,711 pregnancies the miscarriages were more than five times as frequent as still births, but the two added together were only 10.56 per cent. of the living births. Accepting the figure 15 per cent. as an average one, there were thus 2000 miscarriages and still births in Toronto in 1920 According to Jeans (5) and others (3, 4) at least 30 per cent. of these are the result of syphilis, giving a figure of 670 as an index of the prenatal ravages due to this disease alone for one year in Toronto. The effect of syphilis in producing sterility need not be considered since it is a doubtful one. This disease may be an important cause of childless marriages but it is not a frequent cause of sterility.

Post-Natal Mortality

In attempting to obtain statistics regarding the number of infant deaths due to syphilis, one is at once confronted with difficulties. Firstly the luetic infection may be, and probably is, only the remote cause of death and frequently for that reason does not appear on the death certificate at all. Secondly, there is a very evident and very pardonable hesitancy on the part of all physicians to enter syphilis as the cause of death on a certificate which is apt to be as one English physician puts it "hawked about among relatives for the delectation of prudes." In Toronto during the past year there were filed only 19 certificates of death for infants under one year on which the diagnosis of syphilis appeared as either a remote or immediate cause of death. It must be obvious to anyone interested in the problem that this figure is absurdly inaccurate and incomplete. Seventeen cases of congenital syphilis died in the wards of the Hospital for Sick Children alone in that year. Out of curiosity I looked up the certified cause of death in these seventeen cases and discovered that in eight or nearly 50 per cent. there was no mention of syphilis. If a hospital interne who has at hand every facility for making an accurate diagnosis, and who in signing the death certificate is independent of the sensibilities of the relatives, fails to furnish an accurate record of death, is it any wonder that remissness is displayed by the general practitioner who is frequently unable to make a definite diagnosis and who is very liable to suffer professionally if he is honest in his certification?

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*Read before the Section of Child Hygiene of the Canadian Public Health Association, May, 1921.

I have arrived at an approximate figure for the infant deaths due to syphilis by an estimate based on statistics of prevalence. Various estimates have been made of the prevalence of this disease among the infant population. Figures obtained from out-patient departments of hospitals on this continent, and admissions to the wards, show a range of from 2 per cent. to 6 per cent. (6). Jeans believes that 5 per cent. of the infant population is syphilitic (1). Of 725 successive admissions to the medical wards of the Hospital for Sick Children, Toronto, 29 or 4 per cent. were proven serologically and clinically to be syphilitic. Since the great majority of deaths due to lues occur in the first few months of life, and the majority of the hospital admissions are over that age, it is probable that considerably more than 4 per cent. of all births are syphilitic. This would mean 665 luetic children born each year in this city, and of these at least 25 per cent. or 166 would die in the first year of life. According to these figures, syphilis would supersede broncho-pneumonia as a cause of infant deaths in the first year and would take its place beside decomposition, and I am firmly convinced that more accurate death certification would show this to be the case.

A glance at the premature death rate may help to convince the sceptical. There were 305 deaths due to prematurity in this city last year—the largest single factor in the infant mortality. Careful estimates based on serological and post mortem examinations have shown that about 18 per cent. of prematures are syphilitic. (2). Thus here alone we can account for 54 infant deaths due to syphilis or one third of the previous estimate of 166.

TABLE I

Showing estimated wastage due to syphilis in Toronto for one year.

:Registered live-births	13300	
:5% of these syphilitic (estimate)	665	
:25% die in first year		166
:Registered still-births	670	
:30% syphilitic (estimate)		223
:Miscarriages (estimate)	1340	
:30% syphilitic (estimate)		447
:Wastage due to syphilis—Total		836

TABLE II

Showing the wastage in known syphilitic families compared with that in families showing no obvious signs of syphilis. Figures obtained from a variety of sources.

From the Wards and Out-Patient Department of the Hospital for Sick Children, Toronto.

	PER CENT. OF TOTAL PREGNANCIES.				Per ct. of live births
	Miscar. & still births	Prem-atures	Living healthy	Living syphilitic	Died early
Syphilitic families	30.3	2.2	16.6	63.2	30.2
Families showing no obvious signs of syphilis	9.7	0.9	76.0		15.0

CONGENITAL SYPHILIS AND CHILD WELFARE

If a syphilitic infant survives the first twelve months of life there is a much greater chance of his reaching maturity. Approximately 90 per cent. of the deaths due to congenital syphilis occur in the first year. In the United States in 1915 there were 2249 deaths under five years recorded as due to syphilis, and of these 2022 or 90 per cent. occurred in the first year. (7). As a rule the second, third and fourth years are uneventful even in an untreated case. After this time various symptoms and signs—the so-called late or tertiary manifestations of hereditary lues—make their appearance, and it is these manifestations that have an important bearing on the child welfare problem.

It will be seen that the special senses, particularly sight and hearing, the osseous system and the brain are the most frequently attacked. Statistics gathered from various sources show that congenital syphilis is responsible for 31.2 per cent. to 34 per cent. of blindness in children, and for about 17.25 per cent. of acquired deafness (8). It is also an important and frequently unrecognized cause of mental deficiency in children. The frequency of physical deformities due to syphilis may be demonstrated also by a study of a series of cases. During the past 22 months the Hospital for Sick Children has treated in the wards and outpatients' department 127 children suffering from congenital syphilis, and one suffering from the acquired form. Sixty-six of these children were over four years of age, and of these 35 or 53 per cent. have at present or have had interstitial keratitis. In 11 or 16.6 per cent., the sight is permanently impaired. In 4 or 6 per cent., deafness of varying degree is present. Thirteen, or 20 per cent., are mentally deficient, and four of these are partially paralyzed. Twenty-five of the 127 cases have been lost sight of, but of the remaining 102, 26 or 25.5 per cent. died. There are thus 76 cases alive and under observation. Of these, 7 will of necessity become permanent charges on the community as the result of incurable physical or mental defects. Besides the more serious tertiary manifestations already mentioned there are numerous deformities of the bones and joints, such as sabre-shin and arthritis, deformities of the teeth, nose, pharynx and larynx and systemic diseases such as anæmia and malnutrition. In fact of the 66 children over 4 years of age, 47 or 70 per cent. would be marked as physically or mentally sub-standard. When one realizes that at least 5 per cent. of the children of the country are syphilitic, the magnitude of the consequences of the disease will be more thoroughly appreciated.

Apart from the lowering of the physical and mental standard of the child, we must consider also the grave economic losses to the country, which is entailed by the loss of earning capacity and by the sums expended on the treatment, care and education of the more seriously affected.

METHODS OF CONTROL

For convenience sake I have dealt with the solution of the problem under three headings, the control of syphilis in its relation to (a) the birth rate, (b) infant mortality, (c) child welfare.

A. *Birth-rate.*—The two most important factors for consideration here are firstly the education of infected adults, and secondly, the treatment of pregnant syphilitic women. Consideration of the first factor is intimately bound up with the aims and activities of the Canadian National Council for Combating Venereal Diseases and the question is too large a one to permit of more than a brief discussion in this paper. By proper educational propaganda it is hoped to accomplish:—(1) The prevention of marriage of infected adults until they are pronounced cured by a physician; (2) A realization among syphilitics of the necessity of systematic treatment if they are anxious to have healthy children. Syphilis is responsible for a fairly large per cent. of childless marriages and in a great many of these cases the couple, though anxious to have children, are absolutely ignorant of the true cause of the repeated miscarriages and still-births. Many of them would willingly undergo thorough courses of treatment if they were promised thereby even a reasonable chance of parenthood.

The treatment of the pregnant syphilitic woman is a problem for the prenatal clinics and is one that has a great future. In large centres, such as Toronto, the performance of routine Wassermann reactions on every pregnant woman applying for examination is possible. In the Wassermann positive cases the probability of securing a healthy infant by adequate treatment of the mother during the period of gestation has been frequently and conclusively demonstrated.

B. *Infant mortality.* All that has been touched upon in the previous paragraph applies here with equal force Added factors must, however, be considered. There is the treatment of the syphilitic infant as soon as symptoms of the disease appear. With the first evidence of snuffles the child should receive intravenous arsenical medication alternated or combined with mercurial inunctions. The earlier treatment is instituted the better is the prognosis. Since specific treatment is beyond the financial means of many individuals, free-treatment clinics are now in operation in many towns in the province. Such clinics being subsidized by the federal and provincial governments. To my mind the maintenance of the child's general nutrition is of even more importance than anti-syphilitic medication. It is therefore essential that the child be kept nursing since by this means only can we avoid the frequent gastro-intestinal and nutritional disturbances which are common to bottle-fed syphilitic infants. Veeder (9) has shown that the mortality for artificially fed luetic infants is four times as great as for breast-fed ones.

C. *Child welfare.* Under this heading I shall deal mainly with those children who have survived the first year. Recognition by Public Health nurses and by physicians of the tertiary luetic manifestations is of paramount importance if these children are to be referred for treatment. The first step toward this end must be the proper education of nurses during their training and a more thorough teaching of the subject in medical schools. To give you some idea of the results of treatment I have chosen all cases from the special treatment clinic of the Hospital for Sick Children who have been under treatment for a period of more than five months. Such a series, however, gives one no true conception of the mortality of congenital syphilis, since most of the young infants in the secondary stage are admitted directly to the wards of the hospital. As pointed out in the previous paragraph, the mortality for 127 cases was 25.5 per cent. Though this figure may seem unduly large it compares very favorably with figures reported by many other workers in this field. There is every reason to believe that coincident with the more widespread recognition by the laity and the profession of the disease and its seriousness this figure will be materially reduced. I will not attempt to cover the results of treatment as evidenced by the improvement in local lesions such as the eruption, gummatous deposits, periostitis, interstitial keratitis, etc., but will confine the discussion to the results as indicated by the changes in the Wassermann reaction. There are 60 cases in the series who have been under treatment for a period of five months or more. Twelve, or 20 per cent., are apparently cured—that is, have had repeated, consecutive negative Wassermann reactions. Twenty, or 33.3 per cent., are markedly improved, that is, the Wassermann reaction has been reduced to a weakly positive, and in some cases has fluctuated between positive and negative. Twelve cases, or 20 per cent., have been slightly improved, and 16, or 26.6 per cent., have shown no improvement in the intensity of the Wassermann reaction. One very striking fact about the cases has been that those attending for treatment irregularly have shown little or no progress. Of ten children with whom we have had difficulty in this respect seven have shown no improvement. On the whole the results are very encouraging and particularly so in the young infants where treatment is commenced shortly after the first symptoms appear. Much of the success in the last year has been due to the employment of sodium diarsenol instead of diarsenol and neodiarsenol. The first-named drug seems to be particularly suitable for the treatment of syphilis in infants and children. No reaction of even moderately severe grade has been encountered following its administration during the past ten months, and the effect on the Wassermann reaction has been very satisfactory. My own feeling is that there are few cases of hereditary syphilis which cannot be absolutely cured provided we have the intelligent and interested co-operation of the child or parent.

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REVIEW OF A SEASON'S QUARANTINE STATION WORK

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THE quarantine service is the outer ring of protection for the Dominion against the more acutely infectious diseases. This service is maintained by the federal government through the Department of Health, in conformity with international agreement to which thirty-four countries subscribe.

Canada, through the British consular service, is informed of the prevalence of infectious diseases in epidemic form throughout the world. This information is distributed from Ottawa to the various quarantine officers for their guidance in dealing with vessels coming from these areas. Each vessel also has a bill of health from each port of call on its voyage. The medical officer relies on this history in deciding the action necessary to take should a vessel arrive with obscure or undiagnosed disease on board.

Infectious disease from the quarantine standpoint is divided into two classes, major and minor. The major diseases are such as typhus, smallpox, influenza and plague; the minor as scarlet fever, measles and diphtheria. This classification is subject to regulation at all times. The point is that for the major diseases the passengers of the section or class on board ship in which the disease develops are held at the station for its recognized incubation period. Their clothing and effects and if necessary themselves are subject to measures of disinfection. With the minor diseases only the actual sick and such of the immediate family as it is thought best are held. The expense of those admitted to hospital is borne by the government. The maintanance of the contacts is a charge on the vessel. For these the station furnishes quarters, that is buildings, beds, stoves, light, water and heat, All bedding, utensils, food and service is furnished by the vessel.

In the light of this brief outline of the work of the quarantine service let the station at St. John, N.B., illustrate by its experiences during the past year. Two hundred and twenty-three vessels were inspected, with 62,412 people on board; 117 people were admitted to hospital. There were two deaths, one from encephalitis lethargica and one from smallpox; 151 people were detained as contacts; 224 cases of pediculosis were deloused; 121 specimens were examined in the laboratory, being the usual clinical work from the hospital, including one post mortem. Disinfection of bedding was done for the immigration detention in the city.

A few individual examples will illustrate the problems arising during the performance of this work.

January 23rd, L. D., Italian female, 19 years of age, reported by ship's surgeon as P.U.O., probably measles, of one day's duration; face slightly swollen and flushed, eyes injected, slight coryza. Removed to quarantine hospital. On admission temp. 102, pulse 100. Next day the coryza and swelling of the face had disappeared, the injection of the conjunctivæ had increased, there was no rask or Koplic spots, there was a moderate diarrhœa. The fourth day of the disease (temp. 104) a rash appeared, first on the face, then chest and body, as an erythæma, then punctate and slightly hæmorrhagic. Just at this time typhus was reported in New York and the medical officer got busy re-reading its differential diagnosis. A culture of the stool was negative for enteric or dysentery. Microscopical examination showed many living ova of the hookworm Anklyostomum duodenale, but no entamœba or cysts and no mucous. Next day the temperature was down to normal and a typical slightly hæmorrhagic measles rash was apparent. If this case had occurred a little later the boat would have been held with all on board until the diagnosis was established.

March 4th, M. P., English female, 17 years of age, reported by ship's surgeon as P.U.O., found to be rather lethargic, face, neck and chest very flushed, conjunctivæ injected, constipated. Since typhus was not present in Buckinghamshire, the county from which she came, the vessel was allowed to proceed. Admitted to hospital, pulse 96, temp. 102. She soon recovered with rest in bed and catharsis, and was discharged with her chart labelled "intestinal toxæmia" for want of a better diagnosis.

December 19, 7 passengers (6 cabin, 1 steerage) reported by ship's surgeon for delousing. Removed to quarantine with their luggage. Their clothing and effects were placed in the retort of the steam disinfector. While this was being put through they were given three warm showers, with two thorough soapings in the intervals, dried and then rubbed from head to foot with coal oil, the hair being left saturated and all warned of the danger from fire. Later it was found better to saturate the women's hair with the oil both before and after the bath. The passengers were then returned immediately to the vessel, and on to immigration inspection. The medical officer, nurse and assistants wore loose white coats over their clothes, and the nurse a rubber cap as well. Afterward all went through the same mill, sterilized their clothes and had a bath. It was found by experience that putting on the dry hot clothes fresh from the steam retort made it possible to go out immediately into the cold after the bath without discomfort or danger.

March 26th, steamship wirelessed one case smallpox, arrived midnight of the 27th. The ship surgeon had removed the case immediately on its discovery eight days before, along with the two passengers occupying the same room. He then vaccinated all on board who had not indisputable evidence of very recent successful vaccination. He just finished the day before arrival. The medical officer's instructions were to keep the section involved, repeat all unsuccessful vaccinations, fumigate the quarters and release the ship. His aim was to do this with the least delay and fewest detentions providing a reasonable assurance of safety, keeping in mind the available accommodation of the station. The inspection and vaccination were carried out, 110 people brought ashore with complete supplies, and attendants, the quarters on board ship fumigated with formaldehyde and the ship released in 12 hours.

The patient was a cabin passenger, Russian Jew, 24 years of age, with a very mild attack. He shipped at Antwerp and occupied a cabin in C division of D deck. All the cabins in this section were occupied by central Europeans, all ate at the after dining room and used thereafter lounge and living room. A few passengers who also shipped at Antwerp and spoke better English occupied cabins on C deck above, but ate at the after dining room. The rest of the cabin passengers shipped at Southampton, had quarters on other decks, ate at the forward dining room and used the forward lounge and living room, and were Anglo-Saxon. The patient could not speak English, and very few of the same section could speak it even brokenly. This distinction of race and language, along with the separation of quarters, was considered sufficient to warrant keeping this section only, the 110 passengers along with their stewards and attendants.

After a week in detention at the quarantine station another case developed in a man 42 years of age. It was of confluent type fatal in four days. The quarantine was then extended for two weeks from the date of his isolation.

At this same time a case developed among those who had been allowed to proceed, a Belgian woman of 32 who had occupied a cabin on C deck but who had shipped at Antwerp and ate at the after dining room. So far no more cases have been heard from. Fortunately this case was in a community where she was promptly isolated and the spread of the disease prevented.

All three cases had good vaccination marks from childhood. The first case had also been vaccinated at Antwerp and the other two cases on board ship, but all too long after exposure to prevent the attack. None had good takes, but slight immediate reactions as described in Rosenau's textbook. Careful inspection of those detained showed that 102 out of 110 or 92.7 per cent. had well-marked old vaccination scars. There were 277, or an average of 2.5 vaccinations performed on each of these passengers, including Antwerp, the boat and the station. Of these, 25 or nine per cent. were frankly successful reactions; 215, or 77.6 per cent., were immediate reactions, and 13.3 per cent. negative. The fact that another case did not develop in quarantine demonstrated that the immediate reaction if performed in time on those with old scars is an evidence of immunity to such a virulent type of smallpox as this evidently was.

The quarantine regulations provide that in circumstances like this the health authorities of the counties or states to which the passengers are going shall be notified. It had fallen into disuse, but will probably be revived.

The aim throughout has been to treat the sick immigrants not as cases only but as human beings, and in so far as the equipment and staff make it possible, not only to protect the country against disease but to befriend these people, to keep the family units unbroken and their slender stock of funds intact. They frequently come to us with weeping and wailing. I have yet to see one of these non-English-speaking foreigners leave without a smile, and without apparently being contented and grateful.

Editorial

THE PREVENTION OF SMALL-POX

DR. WHITELAW has contributed a timely article in this number on the duties of the physician in regard to small-pox, now prevalent in Edmonton. Since the Spanish-American war there have been numerous outbreaks of a mild type of the disease throughout the continent, and although the Edmonton cases are for the most part of a benign character, with a very low mortality, yet they are more severe than some epidemics of recent years. It is an undoubted fact that a severe case may develop from contact with a case so mild as to readily escape recognition, and as the conditions governing a severe and mild epidemic are unknown, it is of the utmost importance to stamp out the malady at its first appearance. Of all epidemic diseases small-pox is the one which can most surely be prevented, and there is no fact more clearly established in medicine than the value of Jenner's discovery in the prevention of the disease.

We would particularly endorse Dr. Whitelaw's recommendation to employ three, or better still four, points of inoculation; insufficient vaccination can only lead to a discredit of the procedure. In this connection we would quote from an editorial in the *British Medical Journal*: "In the course of the present year there have been reported about 100 cases of small-pox, scattered over a certain area through England. To a greater and greater degree this country is relying on sanitary measures other than vaccination for its protection. How little to be trusted some of these measures are is to be seen in the course of the present outbreaks. They rely for their effectiveness upon early and complete knowledge of the cases occurring; and in the nature of things this is not possible. During the past twenty years primary vaccination of infants has been increasingly neglected in this country, and in that time there has accumulated a large proportion of the population, especially the younger portion of it, wholly unprotected against small-pox. Under such conditions every outbreak of small-pox necessarily creates anxiety, or rather accentuates an anxiety always felt in the knowledge of the continued growth of a danger which the medical profession, despite its warnings, has been powerless to avert."

DEATHS FROM CANCER

THE cancer problem is before us; is knocking at our doors. What can we do to lessen the loss of life from cancer? The death rate from cancer is appalling. During the great war the United States lost about 80,000 soldiers. During the same two years 180,000 people died of cancer in that country. Cancer is now killing one out of every ten persons over forty years of age.

Surgery is doing a good deal. At the onset cancer is a local disease and can generally be removed without danger to life and with promise of no recurrence in a percentage of cases—a percentage that is growing larger as the technique of the operative treatment is perfected. To achieve the best results the disease must be recognized and removed before it has extended to adjacent tissues or to distant parts of the body. Many people are reluctant in seeking advice about growths that are not painful, and cancer is often, may we say unfortunately, insidious in its onset, causing, for a time at least, very little pain or distress.

The American Society for the Control of Cancer is adopting an educational policy. It is trying to impress upon the public the importance of seeking advice at once about growths and lumps and tumours, that may appear to be harmless. They have an organized staff of paid officials who have issued a considerable quantity of literature during the past year, and are planning to make a great effort to interest the public in the importance and magnitude of the cancer problem during the week beginning the 30th of October.

The Canadian Medical Association at Halifax decided that we in Canada should join forces with the American Society for the Control of Cancer. The medical men of Canada and the Canadian Medical Societies can do a good deal towards awakening general interest in this important matter. There can hardly be a doubt that an awakened sense of the need of early advice and treatment of suspicious growths would save thousands of lives each year.

THE TREATMENT OF DIABETES MELLITUS

UNDER-NUTRITION and total dietary regulation have until recently been regarded as the guiding principles in the treatment of diabetes mellitus. The basis for the belief in these principles has been the accurate and detailed work of Allen. Incontestable clinical evidence of their value is the favourable results the treatment based upon them has had upon the mortality statistics.

Recently Woodyatt (1) reported another method. The principles of this treatment appear to be opposite to those generally accepted in that a high fat diet is employed. The relation between fats and acidosis is definitely established. A detailed analysis, however, shows that the diet represents a distinct progress in the treatment of this disease.

Both exogenous and endogenous factors are considered in the interpretation of the total metabolism. From this point of view what we have previously considered as under-nutrition is only apparent not real. In spite of prolonged starvation the heat production of the body is fairly constant. The fuel supply under this condition must, therefore, be of an endogenous origin. From a consideration of the chemical metabolism, it appears that in supplying this fuel, which in a marked case of under-nutrition comes chiefly from the protein, more sugar may be produced than can actually be tolerated. On this basis Woodyatt explains the persistent glycosuria found in some cases of prolonged starvation.

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(1) Woodyatt, R. T., M.D. Objects and methods of diet adjustment in Diabetes. Arch. Int. Med. vol. 28, No. 2, p. 125, (Aug.) 1921.

A definite advance seems to be the dealing with the food supply in terms of end-products of digestion. Carbohydrates, fats and proteins are considered in terms of glucose and fatty acids. Recognition of this method of considering the diet opens a new field in the study of sugar tolerance. By dealing with the food in the same simple terms the maximum amount of fat which can be metabolised in the presence of the limited amount of glucose tolerated is also calculated. This is pointed out as a valuable aid in determining the severity of the disease. In the presence of a low tolerance for glucose less fat can be given, and therefore, the total caloric value of the diet will be insufficient to maintain life under normal conditions. There is, therefore, in this method no departure from the generally accepted views of the relation between fats and acidosis. It is not a high fat diet. A certain amount of fat is given which if withheld will be utilized in any event from the body tissues.

Important for further consideration is the assumption that every 100 grams of protein given a diabetic in a diet will yield 58 grams of glucose. Each case, therefore, is regarded as having reached the stage corresponding in experimental work to the complete diabetic as observed in the totally depancreatized or phloridzinized animal. The good results obtained in the case reported by Woodyatt bear out this view. This treatment, therefore, appears to be an advance in the management of the more severe diabetic. Especially those cases in which there is marked emaciation and in which protein forms the chief source of the body energy. Whether it will apply to the milder type of diabetic further studies will show.

THE FINANCING OF HOSPITALS

To those of us in Canada who are so deeply interested in the financing of our general hospitals, the report just brought in by Lord Cave on hospital financing in the Old Country is exceedingly interesting, in so far as it is the first attempt on the part of the British authorities to rectify the serious financial condition of the English hospital situation of today. Hospital conditions in England have been so entirely different from hospital conditions in the New World that one can find very little in this report of Lord Cave that may be of practical assistance to those of us in Canada. The chief cause of the serious state of affairs in England is not difficult to find. Since their foundation extending back over hundreds of years, the custom in the large English hospitals has always been to treat every patient free of charge. No effort has at any time been made to investigate the patient's financial status in the community. At the same time it must be said, in all fairness, that the majority of the patients that have filled the wards of hospitals in England in the past could not have paid more than a tithe of the cost of their upkeep. It is probable, however, that a considerable percentage of the patients now occupying their public wards could afford to pay a small portion of the cost of their hospitalization, and one wonders why the English authorities have been so tardy in demanding from such a definite contribution.

While this would be regarded as a great departure from the traditions of the Old World, nevertheless, unless some radical movement along these lines is undertaken, it is doubtful if the Government will come forward and continue to bear the entire cost of the annual deficits.

For several years it has been the practice in Canadian hospitals to make a small charge for the public ward patient in cases in which upon investigation by the social worker such a charge seems warranted. This not only tends to instil into the patient a spirit of independence, as opposed to one of pauperism, but it becomes at the end of the year great assistance to the finances of the hospital. By way of example we may state that in looking over the records of one of our Canadian hospitals we note that in 1917 the revenue from the public wards of that institution was in the neighbourhood of thirty thousand dollars. Little or no effort had been made at that time to collect, where possible, even a small sum from the patients. That hospital was slowly committing financial suicide. With the ever-increasing cost of maintenance it became apparent that some means must be taken whereby the revenue might be increased. An energetic movement was started and each patient's account was carefully scrutinized. The result of this was that in 1920 the revenue from the same public wards was over ninety thousand dollars. By such means the income of many hospitals may be increased, and it is reasonable to think that Governments will be induced to listen to the pleas of those institutions that are endeavoring to help themselves, and come forward with some plan whereby hospital finances may be placed on a sound basis. Many authorities, however, are of the opinion that the only relief which the future holds for the financial condition of our hospitals is a general per capita tax made on all residents in each city or province, out of which tax assistance shall be rendered to our hospitals on the basis of the quantity and quality of the medical attention given to the poor; while at the same time philanthropic citizens who desire to perpetuate their own name or that of some relative or revered friend will have the opportunity to give or bequeath funds sufficient for the erection of the buildings made necessary by the steady growth of our cities. While the serious financial conditions of the English hospitals are demanding the earnest consideration of all in England, Canadian institutions realize that steps must be taken in advance to prevent this misfortune occurring here. Unfortunately the character of assistance rendered by the provincial and municipal governments has in the past been very uncertain. It is our hope that the time is not far distant when under federal or provincial guidance, financial assistance will be rendered to all accredited hospitals, for surely the supervision of the health of our citizens is quite as important as the upkeep of roads, canals, police and other departments that have become recognized as necessary to the safety and well-being of our country.

THE CASEINS OF COWS' MILK IN THEIR RELATIONS TO INFANT FEEDING

ALTHOUGH the casein of cows' milk and of human milk have been generally thought to be essentially different from one another owing to their differing reaction in the presence of acids and rennin, this view has been questioned, and in a recent paper (*Amer. Jour. Diseases of Children*, August, 1921) Bosworth states that after careful examination he has found that the caseins of the two milks have a similar composition and similar reactions; the two caseins forming the same series of salts with bases. In cows' milk, however, the casein is present as a calcium caseinate, while in human milk it exists as a potassium caseinate. The difference in the character of the curd formed by the action of rennin appears to be due chiefly to the difference in the salt content of the milk. Soluble calcium salts favour coagulation, while the soluble salts of potassium sodium and ammonium tend to check the formation of it. The development of acidity in cows' milk in the presence of rennin favours coagulation and the greater the acidity, the tougher and firmer the curd. Fresh cows' milk does not curdle on the addition of rennin and may be pasteurized without any coagulation taking place. There is a great difference, however, in the amount of casein present in the two milks. Human milk contains only a small amount of casein and a small percentage of soluble calcium salts, while cows' milk contains more than double the amount of casein formed in human milk, while the salt content is chiefly calcium with only a small amount of sodium and potassium. Owing to this difference in the two milks, human milk coagulates in fine curds in the stomach and passes easily through the pyloric opening, while cows' milk is liable to coagulate in firm tough curds which render passage through the pylorus a difficult matter.

ADVANCES IN PSYCHOLOGY

H. B. BRACKENBURY, in his presidential address, delivered to the Metropolitan Counties Branch of the British Medical Association, recently discussed the advances made in psychology during and since the war. He points out that in no other science has greater advances been made than in medical psychology. A new viewpoint, a new outlook has been established. "Psychology had become not merely the science of mind, mainly concerned with the analysis of consciousness by the method of introspection, but the science of behaviour, whose subject matter is conduct in general and whose conclusions are based on wider observations and experiment than was formerly considered unquestionably legitimate." "The psychologist is a worker who can predict for us human activity with reasonable certainty, and can formulate laws and principles whereby men's actions can be controlled by organized society." He discusses the various methods of estimating a person's measurement of attainment; his measurement of intelligence; his measurement of aptitude and his measurement of character.

He points out how valuable the intelligence tests have been in the field of education by grading the children not by their chronological age, but by their mental age, and in picking out the mentally deficient child so that he can be taught according to his abilities. He shows what a wide influence these tests have had in the field of criminology, as well as their great importance in the field of industry. If a person can be examined and placed in a position where he will produce his maximum with the least possible chance of dissatisfaction, what a boon it would be to the heads of industrial plants.

On this continent great strides have been made along the lines of medical psychology in the United States. On this continent, however, the work is not being done by the psychologist, but more by the psychiatrist trained in psychology. This method is thought to be better, because often the psychiatrist who has had a general medical training can detect physical disabilities or signs of endocrine disorders which the psychologist would miss.

Psychiatry, in its modern sense, is not merely a study of "insane" persons, although, unfortunately, as in other branches of medicine, there are patients who are incurable and require simply physical care. Now-a-days psychiatry has taken upon itself the study of all problems which may have a psychological basis. It has interested itself in the study of human behaviour as it affects our whole social and economic life.

Until lately psychiatry was not given a very prominent place in the medical curriculum of our Medical schools. The reason was that psychiatry was considered merely a study of insane persons who were a danger or a scandal to the community. This old idea of psychiatry is still seen in many of our provincial asylums. Now, however, that psychiatry has taken upon itself the broader study of human behaviour and its relations to all the social problems of the community, there is an increasing demand that our medical graduates be given a more thorough knowledge of this branch of medicine.

In what way then can psychiatry help in the many social problems which are confronting the world today? Its first duty, in order to protect the community, is towards those persons who are mentally abnormal. Some of these patients will of necessity need hospital care and treatment, but it must not be in the old asylum sense. The day of the old custodial type of mental hospital is past (although it has not been abolished in all our provinces). The new mental hospital is conducted more along the lines of a general hospital. Active treatment, research, occupational therapy and social service all form an integral part of the modern mental hospital.

Psychiatry has actively interested itself in education. Today a school system is not complete unless there is a psychiatrist attached to the staff. His duties should be to pick out the mentally defective child, the backward child, the neurotic or psychotic child in the class and advise the best method of educating them, thus preventing the teachers' efforts from being wasted by the presence of such children in the class. Under his guidance special classes will be organized for the training of the different mental types of children, while the supernormal or gifted child will be advised as to the best method of promoting his talents.

The psychiatrist has also been called upon to help in the fields of criminology. Today he is found in every type of court, assisting the Judge in all difficult cases. This is especially true in the Juvenile Court, where the Judge will not consider passing a sentence upon a child until he or she has been given a thorough psychiatric examination. The Judge Baker Foundation in Boston and the Psychopathic Unit of the Juvenile Court in Chicago are examples where the juvenile delinquent is psychologically studied before the solution is found for the delinquency.

All the different social organizations, no matter whether they are dealing with the child, the unemployed, the unmarried mother or the sex offender are calling upon the psychiatrist to solve their problems. They have all tried to solve these problems from a physical basis, but today they are realizing that the study of a patient's behaviour from a psychological standpoint is a very important part in all these problems. When it is realized that from 60 to 70 per cent. of all cases of illegitimacy, and that from 30 to 40 per cent. of our prostitutes are mentally abnormal, one sees the importance of a psychiatric examination.

Finally, in the field of industry, the heads of large industrial plants who have been trying to solve the problems of industrial unrest from a physical standpoint are calling upon psychiatrists to tell them why these problems exist. The mental hygiene of industry is attracting a great deal of attention in the United States, and some of the larger industrial plants have had a psychiatrist attached to their medical staff. Very little of this work has been done in Canada, but there are signs, even in our country, that some of our larger corporations are beginning to realize the fact that there is more than a physical basis to the unrest and under-production in their plants.

The importance of this whole movement is so great that our medical graduates must be given the opportunity to acquire a more thorough understanding in the methods of modern psychiatry. The medical curriculum of our schools must be brought up-to-date, and the general practitioner must be given an opportunity to take post-graduate work along these lines if we are to solve the problems of medicine which affect the community.

FOREWORD

According to resolution duly presented and unanimously adopted at the last annual meeting of the Canadian Medical Association, held in Halifax in July of this year, an annual membership fee of $10.00 becomes effective on January 1, 1922.

After very lengthy and deliberate consideration on the part of the Reorganization Committee of the Association, the Executive Committee, the Council, and finally by the Association as a whole, it became apparent that a national organization such as ours could not hope to continue to function on a $5.00 fee. The actual production cost of the Journal, supplied to each member, amounts to more than the present annual fee of $5.00. By consulting the financial statement appearing in the September issue, you will see that the Association, at the present time, is considerably in debt. In order to retire this indebtedness, a bond issue of $20,000 is being floated, but such an issue would be entirely a stop-gap of the flimsiest character should the annual fee of $5.00 continue, as in a very short time the old mill-stone would be again about our necks.

It must be borne in mind that the obligations upon the Association, aside from publishing a meritorious Medical Journal, are many and varied, if the rightful interests of the medical profession throughout the length and breadth of this country are to be advanced. Your Association must carry on a great number of activities on your behalf, and all such activities cost money. Therefore, please do not think that the annual membership fee is the Journal fee. As a matter of fact, the Journal is being supplied to members gratuitously, as the amount of $10.00 per member now being requested can be utilized in its entirety for purposes in your interests other than the supplying of a Medical Journal.

It is earnestly hoped that every member will realize his obligation and his duty, and that the $10.00 fee will be promptly paid when drafts are made upon the members during the coming year.

News Items

ONTARIO

PROCEEDINGS OF ANNUAL MEETING CONCLUDED

Business session of the Association held at 10.00 a.m., Wednesday, June 1, 1921, with one hundred and fifty members present, and the president, Dr. Mullin, in the chair.

Moved by Dr. Secord and seconded by Dr. Farley:

That the minutes of the last meetings of the Association be taken as read. Carried.

Moved by Dr. Malcolm Cameron and seconded by Dr. Powell:

That the complete amended report of the Committee on General Purposes as appearing herewith in the minutes, be received and confirmed —Carried.

Dr. George A. Bingham, Chairman of the Reorganization Committee of the Canadian Medical Association, was called to address the meeting with reference to the re-organization of the parent Association. Dr. Bingham in outlining the reorganization plan, pointed out that the only outstanding point for serious consideration on the part of all the provincial Associations was the decision of (1) the fee which should be quoted by the Canadian Medical Association, and (2) the advisability of a composite fee in the respective Provinces, covering local, provincial and Dominion Associations.

Moved by Dr. Secord and seconded by Dr. Oliver:

That this Association approve of the principle of a composite fee governing membership in the provincial Associations, but that the matter of amount be left in abeyance until some time following the annual meeting of the Canadian Medical Association to be held in Halifax in July, at which time the fee question will be considered and dealt with. —Carried.

Notice of motion by Dr. Secord that the annual fee of the Ontario Medical Association be increased to ten dollars ($10.00).

The meeting adjourned at 11.00 a.m.

Meeting of the sub-committee on affiliations at 2.30 p.m., Wednesday, June 1st, with the following members of the Committee present: Drs. Argue, Secord, Cruickshank, Longmore, Cameron and Routley.

On motion duly moved and seconded, Dr. Argue was elected Chairman of the Committee, and Dr. Routley, Secretary.

Moved by Dr. Secord and seconded by Dr. Cameron:

That the following applications for affiliation with the Ontario Medical Association be approved and that this recommendation be communicated to the Committee on General Purposes for the approval of that body. —Carried.

Bruce County Medical Society.
Haliburton County Medical Association.
Lanark County Medical Society.
Ontario County Medical Association.
Norfolk County Medical Society.
North Bay Medical Society.
Parry Sound Medical Association.

Moved by Dr. Secord and seconded by Dr. Cameron:

That this Committee recommends to the Committee on General Purposes that the request for affiliation of the Toronto East Medical Association with the Ontario Medical Association be referred to the Academy of Medicine, Toronto, for the necessary permission or otherwise of that body, in accordance with the Constitution and Bylaws, Art. 8. —Carried.

Moved by Dr. Secord and seconded by Dr. Longmore:

That the full report of this Committee on affiliation be communicated to the Committee on General Purposes at its next meeting. —Carried.

Reconvened meeting of the Committee on General Purposes at 10.30 p.m. on Wednesday, June 1, 1921, with forty members of the Committee present.

Following the reading of the report of the subcommittee on affiliations, it was

Moved by Dr. Argue and seconded by Dr. Longmore:

That the report of the sub-committee on affiliations be received and approved, and that the Association be asked to confirm the same. —Carried.

Moved by Dr. Mullin and seconded by Dr. Argue:

That the incoming Board of Directors be instructed to allot the various communications in the hands of this Committee to the respective Committees interested in the subject matter of these various communications. —Carried.

Moved by Dr. Mullin and seconded by Dr. Young:

That a special business meeting of this Association be held in Toronto in the month of December, 1921. —Carried.

Moved by Dr. Mullin and seconded by Dr. Oliver:

That this Committee recommend to the Association the adoption of the Articles embodied in the communication from the Hamilton Medical Society requesting the Federal Government to adopt special forms to be used by the medical profession in the prescribing of narcotic drugs.

Amendment thereto by Drs. Morgan and Argue:

That this communication be transferred to the Committee on Standardization of Drugs.

The amendment on being put to a vote was declared lost; the original motion upon being put to a vote was declared carried.

Moved by Dr. Crane and seconded by Dr. Mullin:

That the report of the Committee on Interrelations of the Medical Profession and the Public be received. Carried.

The report was then considered clause by clause.

Moved by Dr. Marlow and seconded by Dr. Argue:

That clause 14 be not approved, but that this matter should be referred back to the Committee for report at our next annual meeting. Carried.

Moved by Dr. Henderson and seconded by Dr. Marlow:

That this Committee recommend to the Association that the section of the report dealing with specialists be referred back to the Committee for further consideration and report. Carried.

Moved by Dr. Henderson and seconded by Dr. Boyce:

That this Committee recommend to the Association that the word "August" in paragraph 9 of the report be changed to read "October." —Carried.

Moved by Dr. Mullin and seconded by Dr. Oliver:

That the report of the sub-committee on Social Service Council be approved. —Carried.

Moved by Dr. Mullin and seconded by Dr. Marlow:

That the complete report of the Committee on Inter-relations of the Medical Profession and the Public as amended by the foregoing resolutions, be now adopted. Carried.

Moved by Dr. Mullin and seconded by Dr. Oliver:

That the report of the Executive Committee recommending the appointment of a representative of the Ontario Medical Association to the Provincial Board of Health, be not approved. —Carried.

Moved by Dr. Mullin and seconded by Dr. Oliver:

That the amount of money which can be expended by the Directors of the Association as travelling expenses incurred in attending Directors' meetings during the coming year be limited to a total amount not exceeding one thousand dollars ($1,000). —Carried.

Amendment thereto by Drs. Marlow and Woods:

That the Committee on General Purposes approve of the principle of meeting the travelling expenses of Directors attending Directors' meetings, and that the Secretary be instructed to keep a record of such expenses during the year.

The mover and seconder of the original resolution by common consent withdrew the same, the amendment thereby becoming the original motion, which, being put to the vote, was carried.

Moved by Dr. Henderson and seconded by Dr. Bingham:

That a hearty vote of thanks be tendered to Dr. Mullin, the retiring President, for the excellent services which he had rendered during the year.

In addition to the glowing tributes which were paid our retiring President by the mover and seconder of this resolution, Drs. Marlow and Primrose in speaking to the motion expressed the sentiments of every individual member of the Association when it was pointed out that the Association owed a deep debt of gratitude to the retiring President for the untiring zeal and energy and personal sacrifice which he had ever shown in advancing the interests of the Association, and that in a very large measure the Association owed to Dr. Mullin credit for its present active and organized condition. The motion was unanimously carried.

Dr. Mullin, in rising to reply, thanked the Committee for the kind expression of appreciation which had been shown him, and also extended to his brother officers and the individual members, his heartiest thanks for the splendid co-operation which he had been shown, on all sides, in conducting the affairs of the Association during the past year.

Moved by Dr. Mullin and seconded by Dr. Primrose:

That each section of the Programme Committee be allotted the sum of $25.00 as an honorarium for excellent services rendered. —Carried.

Moved by Dr. Mullin and seconded by Dr. Cameron:

That the various items of business appearing in the reports presented to the Committee on General Purposes requiring special resolutions of approval, and not hereinbefore incorporated in the minutes of this Committee, by special resolution be now approved. —Carried.

Dr. Mullin raised the point of remuneration to the Secretary, and called upon the Treasurer to state if the finances in the Association would permit of an increased salary to the Secretary. The Secretary requested that the matter of increased remuneration be left in abeyance at the present time. The matter was, therefore, not further considered.

The Committee adjourned at 11.45 p.m.

Business session of the Association held on Thursday, June 2nd, at 11.30 a.m., with the President, Dr. Mullin, in the chair.

Moved by Dr. Powell and seconded by Dr. Secord:

That the complete report of the Committee on General Purposes be approved. —Carried.

Moved by Dr. Bingham and seconded by Dr. Malcolm Cameron:

That the report of the Nominating Committee be adopted, the chairman declaring the Officers and Directors to be as hereinbefore listed in the report of the Nominating Committee. —Carried.

The meeting adjourned at 12.00 p.m.

Business session of the Association held on Friday, June 3rd, at 11.30 a.m., with the President in the chair.

The President, in recapitulating the entire meeting, expressed his personal thanks to the various sections and members of the annual meeting committee for the co-operation which they had all shown in making this forty-first annual meeting one of interest and enlightenment to all attending. The President then introduced to the meeting the President-elect for the coming year, Dr. Farley, and also had a few words of praise to say regarding the membership comprising the new Board of Directors. The President-elect, Dr. Farley, in being presented to the meeting appealed to all the members of the Association, and particularly the practitioners of the rural districts, to rally round in an effort to support him and his brother officers to keep pace with the splendid work which had been accomplished by the Association during the past year under the regime of the retiring President, Dr. Mullin.

The meeting adjourned at 11.50 p.m

Meeting of the Board of Directors held on Thursday, June 2, 1921, at the Clifton Hotel, Niagara Falls, at 2.30 p.m.,with the following Directors present: Drs. Farley, Brandon, Oliver, Young, Boyce, Secord, Argue, McQuade and Routley.

The President in calling the meeting to order expressed his appreciation of the honour which had been conferred upon him, and asked for the hearty support of the members of the Board for the duties of the coming year.

Moved by Dr. Oliver and seconded by Dr. Boyce:

That accounts as presented for payment and O.K.'d by the Chairmen of sections and committees associated with this annual meeting, also bearing the O.K. signature of the Secretary, be paid. —Carried.

The matter of District Counsellor meetings was then discussed, the following suggestions being noted: Dr. Oliver, the second Thursday in September; Dr. Brandon suggested a meeting at Sault Ste. Marie just previous to visiting Fort William; Dr. McQuade suggested the latter part of September; Dr. Brandon suggested the last week in July; Dr. Young suggested the month of December; Dr. Argue suggested the month of January; Dr. Boyce suggested a period some time between October and April, possibly in Brockville; Dr. Secord for Dr. Krupp suggested some time during the first ten days in November; Dr. Burt to be consulted; Dr. Macdonald to be consulted; Dr. Wilson to be consulted.

Moved by Dr. Secord and seconded by Dr. McQuade:

That this skeleton outline of a programme for Counsellor District meetings be forwarded to the Counsellors, and that the Secretary be instructed to communicate with the Counsellors with a view to arranging these meetings. —Carried.

Moved by Dr. Secord and seconded by Dr. Boyce:

That the following be appointed a Committee on Credentials and Medical Ethics:

Dr. J. H. Elliott, Toronto, *Chairman.*
Dr. J. P. Vrooman, Napanee.
Dr. Alex. Thompson, Strathroy.
Dr. R. W. Mann, Toronto.
Dr. F. W. Routley, Maple.

—Carried.

Moved by Dr. Secord and seconded by Dr. Young:

That the following be appointed to the Committee on Public Health:

Dr. J. W. S. McCullough, Toronto, *Chairman.*
Dr. Edgar Brandon, North Bay.
Dr. Edw. Oliver, Fort William.
Dr. H. W. Hill, London.
Dr. George Clinton, Belleville.

—Carried.

Moved by Dr. Brandon and seconded by Dr. Argue:

That the following be appointed as the Committee on Medical Legislation and By-laws:

Dr. John Ferguson, Toronto, *Chairman.*
Dr. Geo. A. Bingham, Toronto.
Dr. Geo. E. Wilson, Toronto.
Dr. J. P. Morton, Hamilton.
Dr. Frank C. Neal, Peterborough.
Dr. J. Fenton Argue, Ottawa.
Dr. T. H. Middlebro, Owen Sound.
Dr. H. B. Anderson, Toronto.
Dr. A. Primrose, Toronto.
Dr. Angus McKinnon, Guelph.
Dr. J. W. S. McCullough, Toronto.
Dr. N. A. Powell, Toronto.
Dr. W. T. Connell, Kingston.
Dr. J. H. Mullin, Hamilton.
Dr. Geo. R. Cruickshank, Windsor.
Dr. Geo. S. Young, Toronto.
Dr. F. W. Marlow, Toronto.

—Carried.

Moved by Dr. Oliver and seconded by Dr. McQuade:

That the following be the Committee on Necrology:

Dr. Frederick C. Harrison, Toronto, *Chairman.*
Dr. J. H. Elliott, Toronto. —Carried.

Moved by Dr. Secord and seconded by Dr. Boyce:

That the following be appointed as a Committee on Education, with Dr. J. H. Mullin as temporary Chairman, and Dr. T. C. Routley as Secretary:

Dr. A. F. McKenzie, Alliston.
Dr. Fletcher McPhedran, Toronto.
Dr. Robt. T. Noble, Toronto.
Dr. H. B. Anderson, Toronto.
Dr. J. C. Connell, Kingston.
Dr. C. E. Duggan, St. David's.
Dr. J. A. Marquis, Brantford.
Dr. E. W. Hayden, Cobourg.
Dr. Jno. A. Macgregor, London.
Dr. F. W. Marlow, Toronto.
Dr. A. L. Danard, Owen Sound.
Dr. G. Stewart Cameron, Peterborough.
Dr. V. E. Henderson, Toronto.
Dr. Geo. S Young, Toronto.
Dr. F. J. R. Forster, Stratford.
Dr. J. M. Brodie, Woodstock.
Dr. R. L. Langstaff, Richmond Hill.

Dr. W. A. McIntosh, Simcoe.
Dr. A. F. Reynar, Palgrave.
Dr. H. H. Sinclair, Walkerton.
Dr. J. C. Gillie, Fort William.
Dr. J. W. Crane, London.
Dr. L. J. Austin, Kingston.
Dr. Geo. W. Smith, North Bay.
Dr. S. N. Davis, Welland.
Dr. C. H. Bird Gananoque —Carried

Moved by Dr. Argue and seconded by Dr. Secord:

That the following be appointed to the Committee on Inter-relations of the Medical Profession and the Public:

Honorary: Sir Arthur Newsholme, Statistician, Special Lecturer, Johns Hopkins School of Hygiene; Dr. Albert T. Lytle, member Legislative Committee, New York State Medical Society, Buffalo, N.Y.; Dr. Harvey Gaylord, member Legislative Committee, New York State Medical Society, Buffalo, N.Y.; Prof. Gilbert Jackson, Department of Economics, University of Toronto.

Active: Dr. Gordon Bates, Toronto; Dr. W. J. Clarke, Toronto; Dr. J. W. Crane, London; Dr. J. G. Fitzgerald, Toronto; Dr. Charles Hair, Toronto; Dr. J. E. Hett, Kitchener; Dr. H. W. Hill (chairman), London; Dr. F. W. Marlow, Toronto; Dr. J. P. Morton, Hamilton; Dr. J. Heurner Mullin, Hamilton; Gen. A.-E. Ross, Kingston; Dr. T. C. Routley (Secretary), Toronto; Dr. John Sheahan, St. Catharines. —Carried.

Moved by Dr. Young and seconded by Dr. Argue:

That the appointments to the Editorial Board be as follows:

Dr. Norman B. Gwyn, Toronto, *Chairman.*

1. *General Medicine*—Dr. J. H. Elliott, Toronto.
2. *General Surgery*—Dr. E. R. Secord, Brantford.
3. *Pediatrics*—Dr. Alan Brown, Toronto.
4. *Therapeutics, Pharmacology and Physio-Chemistry*—Dr. V. E. Henderson, Toronto.
5. *Gynæcology*—Dr. F. W. Marlow, Toronto.
6. *Obstetrics*—Dr. C. W. Mylks, Kingston.
7. *Ophthalmology*—Dr. Frank C. Trebilcock, Toronto.
8. *Nose and Throat*—Dr. Perry Goldsmith, Toronto.
9. *Neurology and Psychiatry*—Dr. Goldwin Howland, Toronto.
10. *Radiology and Physiotherapy*—Dr. G. E. Richards, Toronto.
11. *Pathology, Bacteriology and Immunology*—Dr. J. G. Fitzgerald, Toronto.
12. *Public Health*—Dr. H. W. Hill, Director, Institute of Public Health, London.
13. *Dermatology*—Dr. D. King Smith, Toronto
14. *Editorial Secretary*—Dr. T. C. Routley, Toronto. —Carried.

Moved by Dr. McQuade and seconded by Dr. Brandon:

That the following be appointed as a Committee on Hospital Standardization:

Dr. E. R. Secord, Brantford, *Chairman.*
Dr. A. T. Gillespie, Fort William.
Dr. C. H. Brown, Ottawa.
Dr. Malcolm H. V. Cameron, Toronto.
Dr. W. T. Connell, Kingston.
Dr. J. A. Macgregor, London.
Dr. J. N. E. Brown, Toronto. —Carried.

Moved by Dr. Young and seconded by Dr. McQuade:

That the following be appointed to the Committee on Library matters:

Dr. E. R. Secord, Brantford, *Chairman.*
Dr. J. H. Elliott, Toronto.
Dr. N. A. Powell, Toronto.
Dr. V. E. Henderson, Toronto.
Dr. J. A. Macgregor, London.
Dr. J. W. Crane, London.
Dr. J. C. Connell, Kingston.
Dr. James Miller, Kingston—with power to add. —Carried.

Moved by Dr. Secord and seconded by Dr. Argue:

That the following be appointed as the Committee on the Standardization of Drugs, the Committee being given power to add and also authority to suggest a more appropriate name for the Committee:

Dr. V. E. Henderson, Toronto, *Chairman.*
Dr. W. T. Connell, Kingston.
Dr. J. W. Crane, London.
—Carried.

Moved by Dr. Secord and seconded by Dr. Boyce:

That the following be appointed to the Committee on Mental Hygiene:

Dr. Helen MacMurchy, Ottawa, *Chairman.*
Dr. Clarence Hincks, Toronto.
Dr. Harvey Clare, Toronto. —Carried.

Moved by Dr. McQuade and seconded by Dr. Argue:

That the following be appointed to the Committee on the Venereal Problem, with power to add:

Dr. Charles Hair, Toronto, *Chairman.*
Dr. Gordon Bates, Toronto.
Dr. B. L. Guyatt, Toronto.
Dr. E. B. Hardy, Toronto.
Dr. E. J. Trow, Toronto.
Dr. N. N. Jones, Toronto.
Dr. Williams, London.
Dr. Gunn, London.

—Carried.

Moved by Dr. Argue and seconded by Dr. Oliver:

That the following be appointed to the Committee on the Nursing Problem:

Dr. F. W. Marlow, Toronto, *Chairman.*
Dr. G. S. Cameron, Peterborough.
Dr. A. E. Ross, Kingston.
Dr. W. A. Lewis, Barrie.
Dr. Robert T. Noble, Toronto.
Dr. D. A. Arnott, London.
Dr. D. M. Robertson, Ottawa. —Carried.

Moved by Dr. Brandon and seconded by Dr. Oliver:

That the following be appointed as the Committee on the Liquor Problem:

Dr. Geo. S. Young, Toronto, *Chairman.*
Dr. J. H. Elliott, Toronto.
Dr. R. J. Gardiner, Toronto.
Dr. John Ferguson, Toronto.
Dr. J. P. Morton, Hamilton.
Dr. W. G. Ross, Toronto.
Dr. W. H. Harris, Toronto.
Dr. G. E. Eakins, Port Arthur.
Dr. A. A. Sheppard, Sault Ste. Marie.
Dr. S. R. Deacon, Stratford.

—Carried.

Moved by Dr. Brandon and seconded by Dr. McQuade:

That the three members of the Ontario Medical Association at present on the Joint Advisory Committee be reappointed, and that the Council of the College of Physicians and Surgeons be respectfully requested to receive these gentlemen along with the three representatives of the Council at the next regular meeting of the Council, and that our representatives be instructed to suggest to the Council the advisability of adding to the Joint Advisory Committee one member from each of the Medical Faculties actively engaged in teaching in this Province. —Carried.

Moved by Dr. Boyce and seconded by Dr. McQuade:

That Drs. George S. Young and Robert T. Noble be requested to suggest the names for our Committees on Programme and Arrangements for our next annual meeting, such names to be placed in the hands of the Directors at a subsequent meeting. —Carried.

Moved by Dr. McQuade and seconded by Dr. Brandon:

That the following gentlemen be appointed as delegates from the Ontario Medical Association to the Canadian Medical Association: Drs. George A. Bingham, J. Fenton Argue, F. W. Marlow and T. C. Routley. —Carried.

Moved by Dr. Brandon and seconded by Dr. Secord:

That the Secretary be authorized to transfer all correspondence to the proper Committees.

—Carried.

Moved by Dr. Argue and seconded by Dr. Oliver:

That action on the request from the Hamilton Medical Society *re* narcotic drugs be delayed for the present. —Carried.

Moved by Dr. Brandon and seconded by Dr. Boyce:

That each Director be requested to keep a record of his travelling expenses to Directors' meetings during the coming year. —Carried.

Moved by Dr. Young and seconded by Dr. McQuade:

That a cheque for twenty-five dollars ($25.00) be sent to the chairman of each section of this annual meeting with a covering letter from the Secretary stating that this honorarium is voted to cover incidental expenses, etc. —Carried.

Moved by Dr. Brandon and seconded by Dr. Oliver:

That the Secretary be instructed to send the Post Graduate Schedule to the individual practitioners in the Province. —Carried.

Moved by Dr. Brandon and seconded by Dr. Argue:

That the Post Graduate Schedule be held pending the report of the Committee on Education with reference to the grant of five thousand dollars ($5,000) voted by the Red Cross, and that accompanying each schedule when sent out, there shall be a Red Letter notice additionally incorporating the particulars under which the schedule shall be operated. —Carried.

Moved by Dr. Secord and seconded by Dr. Young:

That the Chairman of the Committee on Interrelations of the Medical Profession and the Public be asked to draft a letter of explanation to accompany the detailed information blank being sent throughout the Province, and that the Secretary be authorized to take the necessary action in sending out the form. —Carried.

Moved by Dr. Secord and seconded by Dr. Brandon:

That a copy of our Letters Patent and By-laws be sent to the Secretary of each affiliated society, with the explanation that further copies will be supplied individual members upon request. —Carried

Moved by Dr. Secord and seconded by Dr. Oliver:

That the Secretary be authorized to take the necessary action on all business transacted at this forty-first annual meeting. —Carried.

Moved by Dr. Young and seconded by Dr. Boyce:

That mail ballot be taken by Directors on all important questions upon the direction of the President. —Carried.

The meeting adjourned at 5.15 p.m.

End.

A MEETING of the Ontario Neuro-Psychiatric Association was held at the Ontario Hospital, Mimico, on Friday, September 16th. The subjoined programme was presented, and it is hoped that some of the papers will appear in subsequent issues. The officers of this active association are Dr. Edward Ryan, President; Dr. Harvey Clare, Vice-President; Dr. C. W. Crawford, Secretary-Treasurer, with an Executive Committee composed of Drs. William English, Goldwin Howland, N. H. Beemer, R. G. Armour and C. K. Clarke. The papers were as follows:—1. "Medico-Legal Evidence in Criminal Cases: Edward Ryan, M.D., Medical Superintendent, the Ontario Hospital, Kingston; discussion introduced by Hon. W. E. Raney, Attorney-General. 2. "Further Extension of Community Interests to Hospital Patients": N. H. Beemer, M.D., Medical Superintendent, the Ontario Hospital, Mimico; discussion introduced by Hon. F. C. Nixon, Provincial Secretary. 3. "The Therapeutics of Sleep in Relation to Disturbed Mental Conditions": R.D. Rudolf, M.D., Professor of Therapeutics, Toronto University; discussion introduced by G. W. Ross, M.D. 4. "Tonsillar and Dental Infection as Factors in Causation of Nervous and Mental Diseases": H. B. Anderson, M.D., late Associate Professor of Medicine, Toronto University; discussion introduced by George Young, M.D. 5. "The Psychoses of Childhood": W. C. Harriman, M.D., Medical Director, Hospital for Feeble-Minded, Orillia; discussion introduced by A. W. Canfield, M.D..

MEETINGS of the Northumberland and Durham Medical Society were held on September 15th and October 8, 1921. The first meeting was addressed by Dr. John Oille of Toronto, the subject of the discussion being "Blood Pressure." At the second meeting, the procedure took the form of a dinner at which the Society was addressed by Dr. Edward Morgan of Toronto, on the subject of "Some Common Errors in the Diagnosis of Acute Conditions in Infancy."

THE Academy of Medicine of Western Ontario held its first general session of the Society on September 29th, in the Queen Alexandra Sanatorium, Byron, where various phases of pulmonary tuberculosis were presented to a large audience of visiting physicians by Dr. Pretten, Superintendent, and Drs. Moyle, Broome, Andrus and Wilson.

The following week, a post graduate course in tuberculosis diagnosis was given to a number of physicians of western Ontario by the staff of the Sanatorium.

The second general session of the Academy was held in the Medical School, London, on October 7th. The programme was furnished by Dr. Walter E. Dandy, on the Localization and Diagnosis of Inter-cranial Tumours by Pneumography; Dr. Charles F. Neu, Indianapolis, Ind., "Some Phases of Encephalitis Lethargica"; Dr. Robert G. MacRobert, New York, "Fits and Fallacies," a presentation of the subject of epilepsy.

A noon-day luncheon preceded the meeting, and this informal meeting of western Ontario physicians was both a new and popular departure in the proceedings of the Academy.

THE Peel County Medical Association staged the first two meetings of their extensive programme on October 4th and 11th. It is to be hoped that the doctors of Peel County will appreciate the efforts of the President, Dr. Sharp, and the Secretary-Treasurer, Dr. Reynar, for the programme which has been prepared is not only extensive, but is carried on for six meetings. The first meeting was addressed by Dr. T. C. Routley on the work of the Association, by Dr. George S. Young of Toronto on "Goitre," and by Dr. J. W. S. McCullough, Chief Officer of Health, on "The Prevention of Cancer." The second meeting was preceded by a demonstration of x-ray plates by Dr. Sharp of Brampton, after which "The Prognosis and Treatment of Cardiac Irregularities" was discussed by Dr. Gwyn, and "The Prevention of Diphtheria" by Dr. J. G. FitzGerald, and the meeting closed with a paper by Dr. Perry Goldsmith of Toronto on "The Consideration of the Anatomy of the Faucial Tonsils, Their Surgical Removal and the Management of Their Postoperative Complications." Dr. Goldsmith's paper was illustrated by thirty-five elaborate wall plates. Dr. FitzGerald detailed carefully the present-day results of diphtheria control, illustrated by charts and figures of the Connaught Laboratories and the Ontario Board of Health.

THE opening meeting of the Academy of Medicine, Toronto, took the form of a dinner in the newly-built hall of the Academy on October 4th. The new hall, which by the consent of the Fellows will in future be known as "The Osler Hall," was well filled by an attendance of two hundred and fifty guests who listened with pleasure to the presidential address by Dr. Robert Noble, who dealt artistically with the subject of "The Standing of the General Practitioner," illustrating his remarks with portraits of the well-known figures of Toronto's medical past. Short addresses followed by Dr. H. B. Anderson, Chairman of the Financial Committee; Dr. E. E. King, Chairman of the Building Committee, describing the project which resulted in the building of the new hall and the means taken to carry it through. The Secretary's report put before the Fellows the excellent work of the past year and the hopes for the ensuing session. Addresses were also given by the President of the University of Toronto, Sir Robert Falconer; the Rev. Dr. Cody, and by Justice Riddell. A further description of the new building and the plans connected therewith will be given in a later issue.

THE County of Peel Medical Association met in Brampton on Oct. 18th, when the following programme was presented: Dr. B. P. Watson, Toronto, "Obstetrical Injuries and their after results, with especial reference to prevention;" Dr. R. R. McClenahan, member of the Provincial Board of Health, subject, "Public Health Aspects of Venereal Diseases," with moving pictures; Dr. Harvey Clare, Superintendent the Ontario Hospital, subject, "Medical Jurisprudence;" Dr. E. Stanley Ryerson, Toronto, subject, "The Pathology of the Gall Bladder and Bile Ducts and its relation to the clinical manifestations of disease and the surgical treatment indicated"; Dr. J. G. Cunningham, member of the Provincial Board of Health, subject "Occupational Diseases.";Dr. R. V. B. Shier, Toronto, "Surgical Post-Operative Treatment."

DURING the week of October 30th-November 6th, the Cancer Prevention Commission of the United States and Canada held a special meeting for the purposes of general instruction in the recognition and handling of this world-wide scourge. Special addresses of particular interest to the medical profession were made by Dr. Harvey Gaylord and Dr. Schreiner of the New York State Institute for Cancer Research.

ON November 7th, Colonel McCarrison of the R.A.M.C. addressed the Academy of Medicine, Toronto, on the subject of "Diet and its Relations to Diseases of the Thyroid Gland."

THE Section of Obstetrics of the Academy of Medicine, Toronto, met on October 6th; Section of Opthalmology and Othology on October 10th; Medicine on October 11th; Surgery on October 18th, and Pediatrics on October 20th. The Section of Pathology held its opening session on Tuesday evening, 25th. An excellent attendance was on hand to welcome the opening address of this section, given by Dr. Magner, the newly-appointed pathologist of St. Michael's Hospital. An excellent presentation of the subject "Detoxicated Vaccines" was given, and followed by a careful discussion by those in Toronto most interested in this particular branch of pathology.

ON November 8th, a combined meeting of medical and pathological sections of the Academy of Medicine, Toronto, took place in the Osler Hall. The subject of "Encephalitis Lethargica" in its many attitudes was taken up by Professor Boyd of Winnipeg, whose work on the subject has already appeared as one of the most interesting publications bearing on the matter. Other phases of this epidemic, which has been quietly going through the community for the last three years, were presented by members of the profession in Toronto who have seen the disease in its clinical and pathological sides.

On November 4th, the Western Academy of Medicine held its meeting in London. An extensive programme was presented, including a clinic by Dr. L. F. Barker of Johns Hopkins Hospital, Baltimore.

It is earnestly asked that all county societies holding meetings through the year, will send in their programmes to the editor of the Ontario section. If received in time, the Journal will cheerfully advertise these meetings, either in the "News Items" column or elsewhere, as may seem fit if many notices are sent in. It is also requested that a full report of all meetings be forwarded. The development of this phase of medical education in Ontario within the last few years has been remarkable to a degree, and every encouragement will be given to every society wishing to make use of these columns.

The Faculty of Medicine, University of Toronto, furnishes the following details:

The Board of Governors have appointed Dr. Clarence L. Starr to be Professor of Surgery and Head of the Department of Surgery, to date from July 1, 1921.

They have also appointed Dr. George D. Porter special lecturer on Health Education for two years from July 1, 1921.

Dr. J. B. Collip is to be Assistant Professor of Pathological Chemistry.

Dr. Donald Fraser is to be Assistant Professor of Hygiene and Preventive Medicine.

A short graduate course will again be given this year from December 18th to December 24th. The one held last winter was attended by 45 physicians and was considered a great success.

The Faculty have determined to institute a graduate course leading to a diploma of Radiology. The course will extend over one winter session of eight months, during which laboratory and practical work in Physics and Radiology will be carried on. Details as to the date when applications will be received will be announced later.

The registration of students for this year is as follows: First year, 143; Second year, 190; third year six, 145; third year five, 211; fourth year, 224; fifth year, 159; total, 1,072.

District No. 2 medical meeting, comprising the Counties of Brant, Waterloo, Wellington, Oxford, Perth, Huron and Norfolk, was held in Woodstock on the afternoon and evening of Wednesday, October 5th, 1921, under the auspices of the Oxford County Medical Society. During the afternoon session which was presided over by Dr. Sutherland, Vice-President of the local Medical Society, the following programme was presented: "Operative Treatment of Fractures—end results as contrasted with those of other means," Dr. E. R Secord, Brantford; "Review of Blood Pressure," Dr. William Goldie, Toronto; "Medical Side of Tuberculosis Problem as it Affects the General Practitioner," Dr. Charles White, Pittsburg; "Acute Abdominal Emergencies," Dr. Herbert Bruce, Toronto. Supper was served at 6.00 p.m. by the ladies of Knox Church in the banquet hall beneath the place of meeting, and most enjoyable indeed was the repast which was provided. Due to the absence of the President of the Association, Dr. E. R. Secord, First Vice-President, outlined some of the aims and objects of the Association, and was followed by Dr. T. C. Routley, Secretary of the Ontario Medical Association, who recounted some of the activities which had been carried on by the Association during the past year. The attendance was over one hundred. The papers and discussion which followed were interesting and instructive. The meeting was undoubtedly one of the best district meetings which has ever been held in the Province. An eight o'clock adjournment made it possible for all present to reach home at a reasonable hour.

A district medical meeting of the Counties of Peterborough, Victoria, Durham, Northumberland, Hastings, Prince Edward and Haliburton, was held in the city of Peterborough on Wednesday, September 21, 1921, under the auspices of the Peterborough Medical Society. The meeting was called to order at 2.30 p.m. by Dr. Joseph Morgan, President of the local Society, with about fifty doctors in the district present. Dr. Morgan in extending a welcome to the profession, turned the meeting over to the chairmanship of Dr. E. A. McQuade, of Trenton, Counsellor of the District.

During the afternoon the following programme was presented: "Cardiac Murmurs," Dr. J. M. McCulloch, Peterborough; "Disorders Peculiar to the New-Born Child," Dr. A. C. Kindred, Tweed; "Pain in Appendicitis," Dr. F. P. McNulty, Peterborough; "Physical Therapy," Dr. N. F. Sutton, Peterborough; "Results Following Removal of Portion of Tibia After Injury," Dr. A. S. Tilley, Bowmanville; "Cystitis and Allied Causes of Frequency," Dr. R. A. McComb, Toronto; "Organization Progress in Ontario and the other Provinces," Dr. T. C. Routley, Toronto.

Particularly worthy of note was the very free discussion which followed every paper, practically every man present having something of interest to say during the progress of the meeting.

An excellent banquet was served at 7.00 p.m., and was followed by a splendid talk from Dr. F. J. Farley of Trenton, President of the Ontario Medical Association. Dr. Farley referred to the activities which had been in progress during the past few weeks by way of visits to many parts of the Province, and in his own inimitable manner impressed upon the gathering the need for closer co-operation and greater organization of the profession.

The address of the evening was given by Dr. F. W. Marlow, of Toronto, his subject being "The Diagnosis and Treatment of Some Gynæcological Conditions"

The meeting adjourned at midnight after a very successful and profitable session.

Dr. James Third, of Kingston, Ont., sailed last month for Bermuda, where he will spend the winter. His many friends, not only in Kingston but throughout the Dominion, will hope that he may be able to return and resume his work with the coming of the warm weather next spring

NOVA SCOTIA

At the last session of the Legislature of Nova Scotia three bills were enacted which are intended to procure betterment of certain social problems which are by no means restricted to the province by the sea. One of these authorizes the provincial government to establish an institution for the care and education of the feeble minded; the second provides for the creation of two hospital centres and other institutions for the treatment and care of the insane; while the third makes provision for prison farms along modern lines. The legislation was inspired by the report on a mental hygiene survey of the province recently conducted by the Canadian National Committee for Mental Hygiene. The developments which will follow upon the enactments will be watched with interest by those who realize the need for better institutional provision for those belonging to the several groups, for whose benefit the legislation has been designed. The provincial hospital for the insane, now being operated near Halifax, compares very favourably with similar institutions elsewhere. but many of the chronic cases of insanity are housed in county asylums, most of which are not well conducted. Except for a small, though very excellent, institution at Halifax, there is no accommodation for the feeble minded other than that afforded in county asylums, where no training is attempted. Few of the county gaols have facilities for the employment of prisoners. There is, therefore, plenty of opportunity for improving upon present conditions in respect of the care of persons of these types in "Bluenose Land."

QUEBEC

The first annual conference of the Canadian National Council on Child Welfare was held in Montreal at the Windsor Hotel on September 29th. and 30th. 1921. This national organization (the fourth to receive official recognition by the Federal Department of Health) was organized in 1920 and is composed of voluntary associations engaged in the several phases of Child Welfare throughout Canada. This first conference must be regarded as a distinct success, and was attended by delegates from every province. An important address in the Health Section was delivered by Miss Sally Lucas Jean, Director of the Child Health Organization of America, who spoke on 'Health, Strength and Joy for Canada's School Children," and demonstrated what business ability and indomitable energy can do in safeguarding the health of children. In this health crusade, efforts must be concentrated on the formation of "health habits" in the child rather than on the presentation of academic information about hygiene or physiology. Dr. W. A. L. Styles, Executive Secretary of the Child Welfare Association of Montreal, read a paper bearing on "The Child Health Train in Quebec." This first-in-Canada Child Health train during the past summer visited 37 communities, covering over 1100 miles of an itinerary. The staff was composed of two physicians, three nurses and three social workers, and occupied two railroad coaches suitably remodelled and equipped, the generous loan of the C.P.R. The roads over which it ran generously gave free haulage. The work carried on by this train was under the direct control of the Child Welfare Association of Montreal, and received the endorsement of Quebec Provincial Red Cross, and Social Service Departments of Montreal and McGill Universities. At all the small towns and villages at which it stopped, addresses were made and methods shown for the proper hygiene and feeding of infants, a matter on which much ignorance is still prevalent. The 1920 infant mortality rate of Quebec Province (16.2 per cent.) although lower than it was in the past, is unduly high, and surpasses the illegitimate infant mortality in Great Britain. Dr. W. W. Chipman presented an interesting paper entitled "The Infant Soldier," in which he took occasion to introduce much common sense bearing upon certain prevailing society fads, which he said represented the superstitions of the past regarding public health and safety. Miss Mary Power of the Child Hygiene Bureau, Ontario Department of Health, in speaking on "The Government Health Clinic of Ontario", detailed miscellaneous activities of the Bureau, whose annual budget amounts to $40,000. Dr. Ruggles George, Canadian Red Cross Society, Toronto, emphasized the importance of "Milk as a Vital Food Product.' Miss Eunice Dyke, Department of Health, Toronto, described in detail the methods employed in the public schools of Toronto for the removal of physical defects. The six sessions of the Conference were well attended, and were presided over by Hon. L. A. David, Secretary of State of the Quebec Government, and by Dr. Helen MacMurchy, Federal Health Department, Ottawa. All papers read at the Conference are being printed in "Social Worker," which may be obtained upon application from Miss Charlotte Whitton, Confederation Life Bldg., Toronto.

MANITOBA

The Manitoba Medical Association holds its annual meeting in Winnipeg on November 9th, 10th and 11th. An extensive programme has been arranged. In addition to the usual presentation of papers, full opportunity will be given to its members to discuss medical problems of both professional and Association interest. A question box has been instituted. It is desired to divide the province into a number of districts, each of which may have its own active medical society, and be in relation to the Association. The Secretary of the Canadian Medical Association will visit Manitoba at the invitation of the Executive Committee, and will give the benefit of his experience to assist in this organization. In this manner the executive hopes to keep in touch more intimately than in the past with all members of the profession in the province.

The increasing prevalence of cancer in Manitoba is calling forth united measures for drawing attention to methods of prevention. In this work the Public Health Board, and Provincial Public Health Department have the co-operation of the Medical Health Officer for Winnipeg, the President of the Manitoba Medical Association, and Dr. R. J. Blanchard. The Government will probably be requested to provide pamphlets suitable for the education of the public, and it is planned to distribute this literature at meetings to be addressed by physicians in various localities. In this connection, suitable statistical material and other information will be furnished to all medical men in the province.

Three hundredst udents arere gistered in the Faculty of Medicine for the session 1921-22, and of these 110 are in the freshman class. The equivalent of one year's arts work in the premedical sciences will be demanded before the completion of matriculation in medicine. One of the new buildings made available by the Rockefeller gift is now in use, and houses the Departments of Physiology, Biochemistry, and Bacteriology. A second unit was begun in August, and will probably be ready in February to accommodate the Department of Pathology. Dr. V. H. K. Moorhouse of Toronto, who was appointed to the Chair in Physiology in sequence to Dr. Swale Vincent (now Professor of that subject at Middlesex Hospital, London), has taken up his duties.

THE first annual meeting of the Manitoba Hospital Association will be held in Winnipeg on November 7th and 8th, prior to the annual meeting of the Manitoba Medical Association, so as to facilitate a large attendance of members. In addition to ample opportunity for a round table discussion on hospital problems, the programme includes consideration of the following subjects: hospital finances, legislation and government aid to hospitals, hospital accounting and purchasing, nursing problems and affiliation of training schools. Dr. George Stephens will address the convention on "The Modern Hospital and its Community Relations." The application of the minimum standard will be the chief subject of discussion in a paper entitled "The Professional Work of the Hospital" by Dr. James McKenty. City hospitals will be inspected, hospital equipment exhibited, and officers elected for the coming year.

THE first case in which an irregular practitioner has been tried under the Manitoba Medical Act has resulted in a conviction. The complainant, who was suffering from amyotrophic lateral sclerosis, received treatment from a chiropractor, and brought his action in the interest of poor people whom he considered were being deceived by the defendant. The case was brought under section 78 of the Act, for treating or professing to treat whilst not being a licensed practitioner under the Act.

THE Northwest Manitoba Medical Society: Meetings of this society have been carried on most actively and successfully during the past season. Dr. G. S. Fahrni addressed a meeting at Virden on September 15th on the subject of "Goitre," and Dr. Charles Hunter on "Neurosis." Clinical cases were shown by Doctors Clingan, Ross and Fryer. Dr. M. C. O'Brien, the Secretary, was the speaker at a public meeting held in the evening, and two films of general health interest, lent by the Medical Health Officer of Winnipeg, were shown to a large audience.

GROUP clinical meetings are now held at regular and frequent intervals by the following Winnipeg Hospitals: St. Boniface, Children's, Winnipeg General, Miseracordia, and Victoria.

DR. HUBERT KITCHEN of Souris, who graduated in medicine this year, has been appointed to a fellowship in the Rockefeller Foundation, and will investigate problems in metabolism at the Mayo Medical School, Rochester, Minn.

A REPORT recently issued by the Provincial Psychiatrist contains interesting reading. The total admissions for the previous year to the three institutions was 69. The work of the psychopathic clinic in Winnipeg has proved very successful in securing early treatment for patients, a very important factor in mental cases. The facilities for admission to the clinic are appreciated by those to whom the formalities customary in mental hospitals are objectionable, and so often accentuate the distress of relatives and friends. Of 199 patients discharged from this one institution, 48 were reported as completely recovered, 137 improved, and only 14 unimproved. There were 62 deaths. Reorganization of the hospital service at Brandon, and Selkirk, has been ably undertaken by Dr. C. A. Barager and Dr. E. C. Barnes respectively. Proper housing facilities for nurses have been inadequate, and depleted staffs have been the result. A school for feeble-minded has been started at Portage la Prairie. It is hoped to establish mental clinics throughout the province during the coming year.

ALBERTA

The new wing of the Royal Alexandra Hospital, which exclusive of equipment will cost approximately $275,000, is now nearing completion and will be opened about January, 1922. The hospital will then have accommodation for 250 patients, and will have all modern facilities for giving the best service possible, surgical, medical and maternity. A medical superintendent will shortly be appointed, for which position applications are now being requested Since the resignation of Dr Fyshe last December, the position has been vacant, but the near completion of the new wing and the increased accommodation for patients thereby secured has made the appointment of such an official very advisable. A training school for nurses, of whom there are about 45 is maintained. This hospital has been built and is financed entirely as a city hospital.

The recently completed extension to the General Hospital includes a nursing home for the nurses, rooms for x-ray equipment, a laboratory and maternity wards, and is a splendid addition of four storeys which would be a credit to any hospital. It has been erected at a cost of over $100,000 and increases the available accommodation to 175 beds The facilities provided for the treatment of all classes of patients, surgical, medical and maternity, are excellent. This hospital is conducted under the management of the Grey Nuns, and was the first hospital enterprise established in Edmonton, the nucleus of the present hospital having been built in 1895. A training school for nurses is also carried on with about 60 nurses in training at the present.

The Strathcona Hospital, near the University of Alberta, is a well-equipped and fully modern institution erected as a City Hospital at a cost of $300,000, which has been placed at the disposal of the S.C.R. for the care and treatment of sick and disabled soldiers. There are at the present time about 150 patients under treatment in it. It is likely that it will be required for this purpose for some time to come.

The Misaricordia Hospital conducted by the Sisters of Misraicordia is a modern building with complete equipment for the comfort and convenience of patients. Only the southern part of the hospital, as designed, has yet been erected. The capacity of this wing is 75 patients Nurses to the number of 18 are taking the course of training provided at this hospital

The Isolation Hospital, which includes a detached building for the cure of patients suffering from smallpox, with a capacity of 90 beds, is the only hospital in Edmonton which does not attain to modern standards as regards the building and accommodation. For some years the need of a new hospital has been acutely felt and it is anticipated that something will be done in the near future to provide a new and complete hospital for infectious disease.

The total bed capacity for the Edmonton hospitals, including the Isolation Hospital, at the end of 1921 will be approximately 750 beds.

BRITISH COLUMBIA

The Board of Trade of Vancouver has established a health bureau as one of its sections. This section meets twice a month and exists for the purpose of educating the general public in public health and medical problems. It is the intention to give a regular course of lectures or talks on these matters.

The Vancouver Medical Association will begin its regular meetings for its twenty-third session on October 10th under the presidency of Dr. F. P. Patterson. The other executive officers are Dr. J. J. Mason as vice-president and Dr. L. MacMillan as secretary.

The pathological and physiological section of the Association has anticipated the parent society and already held two meetings. This section was formed last year for the purpose of studying the scientific aspect of medicine as opposed to the severely practical, and sufficient interest in its meetings was manifested to justify its continued existence. Last year an important subject for discussion was acidosis, and this year already a very comprehensive study of the kidney and its function is under way.

Among the notable activities of the University of British Columbia of interest to medical men is a class of eighteen nurses, who are following a course in public health, ten of which are in receipt of scholarships from the Victorian Order of Nurses. Dr. R. H. Mullin is the professor, and has as his associate Miss Mary Ard Mackenzie. Drs. Carder, Wightman, Dobson and Vrooman also render voluntary assistance in this department.

GENERAL

Notes on child welfare work in Austria by the American Red Cross Society have been received. In these the statement is made that the Society has taken over 100 child welfare stations which were about to close from lack of funds, and has guaranteed financial support for a period of one year. Austria was a pioneer in scientific child health work before the war. At that time stations were established in many parts of the country, in which children were weighed, measured and carefully examined by competent physicians. The nurse in charge of each station was expected to visit the homes of the most needy of the attending children. After the war the appalling condition of the children was such that many foreign agencies came forward with assistance, and rations for the destitute, worked out by experts in child feeding, were supplied gratis to a large extent. In addition, owing to the lack of trained workers, a short practical course was given to all the nurses under careful organization. Great work has been accomplished not only in Vienna, but throughout all Austria.

100,000 COPIES

The January issue of the Medical Review of Reviews is to be sent as a New Year's gift to practically every physician in the United States and Canada. This issue will be one of the most valuable which has ever been prepared and we trust that the physicians who receive this number will read it with interest and profit.

We congratulate the Medical Review of Reviews on this progressive move and trust they will meet with success in a great undertaking.

Abstracts from Current Literature

SURGERY

The Postural or so-called Static Deformities.

Bankart, A. S. Blundell: Brit. M. J. April 23-30, 1921.

In speaking of scoliosis Mr. Bankart introduces some interesting theories He maintains that an ordinary scoliosis is due, not to muscular weakness, but to deficiency of the habitual subconscious state of reflex activity which normally maintains the upright attitude, which latter he terms the postural reflex. Hence exercises are only one of the means to the end that the patient's postural reflex may become a habit. Corrective jackets or spinal supports are indicated only when the curve is not held in check by active treatment by exercises. As regards the cause of scoliosis, it is pointed out that the upright position of the body is maintained by continuous reflex muscular activity, controlled by a special nervous mechanism of its own. Hence faulty posture suggests faults in this nervous mechanism, associated possibly with labyrinthine, cortical, or cerebellar influence. Abnormal postures thus are primarily nervous or mental in origin, are in fact functional nervous disorders, associated with mental fatigue or inertia. The frequent association of scoliosis with neurasthenia was pointed out twenty years ago by Oppenheim. The fixation of a spine once curved is of the nature of a functional contracture of the muscles of the concave side In other words there is a lack of the normal lengthening impulses to those contractured muscles which, as physiologists are agreed, accompany shortening impulses to the antagonistic muscles. Hence the rapid fixation of the deformity.

In discussing flat-foot Mr. Bankart points out that the arch of the foot is supported, not by continuous strain on the ligaments, but by muscular activity, continuous and reflex. It is not the function of ligaments to withstand continuous strain, this is the function of muscles. There is a postural reflex acting in the feet, by which the tendency to passive abduction and eversion by the body weight is continuously resisted by movements of adduction and inversion.

Mental fatigue or inertia, anæmia, constipation, adenoids, all have a place in the etiology of flat-foot as in that of scoliosis. The postural reflex may be exhausted by continuous strain of standing or may be inhibited by some painful condition of the foot itself, e.g., sprain, gonorrhœa.

The treatment is (1) to restore the natural form of the foot if possible; (2) to relieve the postural muscles from strain during the period of recovery; and (3) to re-establish the postural reflex. A rigid foot needs to be made supple; a forcibly abducted foot needs to be straightened. Rigid arch supports are irrational, and tilting the boot is not efficient, as the whole foot slips to the outside. A moulded insole, with depressions for the points of support, gives the best results.

J. A. Nutter

Stoffel's Operation for Spastic Paralysis, with report of thirty-two cases.

G. A. Bruce Am. Orthop. Surg., Feb 1921, Vol. 3, p. 52.

Reference is made to Adolf Stoffel's paper "The Treatment of Spastic Contractures" in the American Journal of Orthopædic Surgery, May, 1913, Vol. X., No. 4, describing the method of peripheral neurectomy of motor nerves.

Patients (usually children) with spastic paralysis often show mental deficiency. They learn to walk late, owing to spastic contractures of the legs, principally abduction of the thighs, flexion of the knees, and plantar flexion of the feet. Treatment of such deformities has been largely by tenotomies and tendon transfers, with over correction in plaster of Paris. It is to be remembered that in these cases the element of spasticity far over-shadows the element of paralysis. The normal balance between antagonistic muscle groups is under cerebral control, but in spastic paralysis this control has been more or less lost, and the more powerful muscles overcome and practically obliterate their weaker antagonists. By the Stoffel operation of excision of portions of motor nerves the spastic or over-powerful muscles are weakened until muscle equilibrium has been established. How much of the nerve should be resected is a matter of judgement, as it is better to remove too little than too much. The technique is then described for resecting portions of the median, obturator, sciatic and internal popliteal nerves for typical deformities. In the case of the median (it being assured that pronation and flexion contractures have occurred) a certain amount of paralysis is produced in the muscles of pronation and in the flexors of the wrist and fingers. An analogous procedure is followed out in connection with adduction deformity at the hip, flexion deformity at the knee, etc.

Stoffel in his after treatment always uses over correction and fixation. This is used by Dr. Gill only in resistant cases where even under an anæsthetic, force is necessary to overcome the deformity. Excellent results are described, and case reports are given.

J A. Nutter.

Report of a Case of Loose Osteocartilaginous Bodies in the Knee Joint.

Blanco, Pio. Am. Jour. Orthop. Surg., March, 1921.

The case reported is thought to be one of osteochrondritis dissicans, and the coincidence of thyroid disturbance gave it additional interest.

It concerns a woman of 35 whose knee, following injury, became swollen and painful and locked at times. Focal infection was present to a marked extent in the tonsils, to a mild extent in the teeth. The knees were normal in appearance but possessed leathery crepitus and restricted motion. X-rays shewed marked loss of substance, particularly in the condyles of both femurs. On operation loose pieces, mainly cartilaginous but containing some bone, were removed. The operation did not improve the range of motion of the knees, though the locking disappeared. Removal of the diseased tonsils was followed by a septic reaction in which the knees did not participate. The patient had had the superior thyroid arteries tied off for hyperthyroidism 11 years before, and at time of operation was suffering from hypothyroidism.

J. A. Nutter

Anterior Bow-Legs. Blanchard, Wallace: Am. Jour. Orthop. Surg., Jan., 1921, Vol. 3.

Anterior bent tibia is seldom exclusively an anterior deformity except in the earliest stage, for the reason that as the deformity progresses it usually goes to one side or the other in the direction of the least resistance. Cases of ordinary degree of deformity are treated first by transverse tenotomy of the tendo Achillis, following which, the tibia and fibula are fractured laterally at the point of greatest deformity by the Grattan osteoclast. This is done even when the deformity is near a joint. The legs are then straightened by the hands and put up in plaster of Paris. In six weeks the child is walking. In extreme cases where the anterior bowing shortens the leg by one-half it is evident that the nerves, blood vessels, etc., will not stretch sufficiently to permit of full correction at one sitting. In such cases osteoclasis is done at different levels every three or four months, accompanied by tenotomy of the tendo achillis. In this way the soft parts are allowed to stretch gradually. In the correction of knock-knees accompanied by anterior bent tibiæ the correction of the knee deformity frequently neutralizes the bent tibiæ. Care must be taken not to operate before the rickets has run its course, for fear of non-union.

J. A. Nutter

Restoration of Shoulder Function in Cases of Loss of Head and Upper Portion of Humerus. Albee, Fred. H.: Surg. Gynæc. and Obst., Jan., 1921, Vol. 32, p. 1.

Albee divides the cases of flail shoulder joint into two groups. In the first group the muscles about the shoulder are capable of being used. Here a portion of the fibula is grafted into the humeral shaft, the muscles attached to the graft either individually or en masse, according to their condition for use.

In the second group damage to the shoulder muscles has been so great that restoration of joint motion is impossible. Here an arthrodesis of the shoulder is done by making a trellis-work of tibial bone grafts. Bony union is expected, and the muscles moving the scapula provide useful movement for the arm.

Interesting case reports are given, where the flail condition was due both to neoplasm and to compound fracture.

J. A. Nutter.

MEDICINE

Some Causative Factors of Pulmonary Tuberculosis. Brown, Lawrason, Amer. Rev. of Tuberc., Aug., 1921, p. 518.

There is only one fact about the whole problem of pulmonary tuberculosis concerning which all authorities are in accord, namely, that pulmonary tuberculosis is due always to the presence of tubercle bacilli in the lungs.

Perhaps a second incontrovertible fact is that a large proportion of urban population harbours the tubercle bacillus by the time they reach puberty.

One must separate as clearly as possible those causative factors that bring about infection from those that bring about the development of infection into clinical disease. The danger of tuberculous meat is practically nil, but the danger of milk containing bovine tubercle bacilli is more real. The bovine tubercle is the cause of 24 per cent. of cases of tuberculosis under 16 years of age or of 4.3 per cent. of pulmonary tuberculosis in children under five years of age, but of less than one per cent. of the total number of cases of pulmonary tuberculosis. The mutation of the bovine to the human type of bacillus has never been proved, so that, as far as adults are concerned, the human type of bacillus alone is of practical importance. Little is known about the existence of the human tubercle bacillus outside the body. When tuberculous sputum becomed dried and ground into dust out-of-doors the bacilli are so weakened that they are of little danger. House dust on the other hand is much more dangerous. Virulent tubercle bacilli have been found in the dust of a room six weeks after the death of a consumptive, but usually at the end of six months all infectivity has gone. It cannot be denied that droplets of sputum scattered when a tuberculous patient coughs may contain tubercle bacilli, and may be deposited three or four feet from the patient, but the bacilli are readily exposed to the destroying influences of light, air, and drying, and it is unlikely that they persist alive or infectious for more than a few hours. While direct contact with the patient, except in the form of kissing, utensils, and house-flies, are possible forms of transmission they are not common, but hand-to-mouth infection is probably far more common than hitherto recognized. That but one case of tuberculosis has developed in any of the employees at the Trudeau

Sanitarium during the 36 years of its existence indicates how purely theoretical such danger is. The resistance of the host to the tubercle bacillus and the accidental location of the disease has unquestionably more to do with the type of disease than variations in virulence. The number of bacilli on the other hand has a marked influence on the disease; no one is so immune that a sufficiently large number of tubercle bacilli will not produce infection and ultimate disease. Children are practically all susceptible to tuberculosis and cannot be guarded too carefully against infection. A tuberculous mother should never nurse or handle her child. While the number of children infected increases with age up to puberty, the mortality decreases. It is impossible at present to determine to which type of tubercle bacilli the majority of infections in early childhood are due, so that protection of the very young against tuberculous milk must be very strict. The claim that the early infection with the bovine type immunizes against pulmonary tuberculosis in adult life, is too far from being proved to permit us to view with equanimity bovine tuberculosis in young children. Heredity may be of some importance. The inheritance of certain physical peculiarities cannot be denied and it is possible that after infection certain inherited characteristics may lead on the one side to increased and on the other to lessened resistance. Race has unquestionably some relationship to the mortality from pulmonary tuberculosis. Whether re- infection occurs from within or without is a much-disputed point. Of all natural methods of infection, that by inhalation requires the smallest dose and is very often the direct source of infection. Adult pulmonary tuberculosis is almost always situated at the periphery where inhalation infection would explain it, while childhood infection. most often arises around the roots of the lungs. Inhalation infection requires far fewer tubercle bacilli than ingestion and it seems possible that sooner or later all of us breathe tubercle bacilli into our lungs. Most of these inhalation infections do not "take," that is, develop into disease, but sooner or later some do, and the resulting pulmonary tuberculosis is due to this secondary infection occurring from without in adult life. Re-infection after puberty is then the essential factor in at least 50 per cent. of all adult pulmonary tuberculosis infection: the development of this infection into definite clinical pulmonary tuberculosis may be due to any debilitating factor.

D. Grant Campbell

Streptococcus Hæmolyticus Empyæma. Johnston, James I.: Amer. Jour. Med. Sci., August, 1921, p. 206.

The author deals with this condition from the internist's point of view. He brings out the fact that during the recent large epidemics of influenza, empyæma was not a common complication, but that in the subsequent minor epidemics an undue proportion of pleural effusions have occurred.

A large number of these effusions have been shown to be caused by the streptococcus hæmolyticus; in such cases the characteristic feature has been that the effusion has occurred as a complication rather than a sequel of the acute pulmonary infection. He considers that in these cases the effusion is a purulent one from the start and he recommends frequent aspirations at two or three day intervals until the acute stage is over, when surgical interference may be more safely sought.

There is rapid improvement subsequent to the first aspiration and out of proportion to the amount withdrawn, an increased high-pitched vocal resonance has been found of more assistance than any other sign in determining the presence of fluid even though the quantity be very small in amount. The fluid at the first aspiration is ordinarily amber colored, but with each succeeding tapping becomes darker and more purulent, and when the pus has assumed a chocolate appearance rib resection is indicated.

His results with this plan of procedure have been very gratifying.

D. Grant Campbell

Asthma and Allied Disorders—Discussion on Opening Paper. Rolleston, Sir Humphrey: Brit. Med. Jour, Aug. 13, 1921.

The writer classifies with asthma, as definite members of the group of toxic idiopathies, hay fever, urticaria, angioneurotic œdema, Henoch's purpura, eczema and acute dermatitis, while doubtful examples include migraine, epilepsy, cyclic vomiting and gout.

He sets himself to answer the question, "Are we in a position to exclude a reflex explanation of some cases of asthma and to consider that they are all due to hyper-sensitiveness?" He considers that heredity is much more often present than available figures indicate and that the more marked the hereditary influence the earlier in life the manifestation of sensibility. It is open to discussion whether in man sensitization is acquired in the absence of a transmitted tendency that has been latent until stimulated into a specific hypersensitiveness. Age has a very distinct influence on sensibility to skin tests. In infancy and childhood foods are mainly responsible for asthma; in early adult life emanations from horses and other animals come to the fore, and in later life bacterial infection is the main initial cause. The skin tests have very considerable limitations although they offer the best means of diagnosis of protein sensibility at present available. Treatment is classified in three groups: (1) prophylactic, (2) specific, (3) non-specific.

The specific he feels is always satisfactory in cases of pollen fever, if carried out in advance of the season. Patients sensitive to the protein of animal hair such as horse dandruff, cat, dog or cow hair, or feathers are readily desensitized by subcutaneous injection of the protein, whereas patients sensitive to food proteins do not respond satisfactorily to this line of treatment. Exclusion of the offending foods from the diet is the only beneficial treatment. Vaccine treatment is satisfactory only when truly specific and in properly selected cases.

As a non-specific form of treatment it seems clear that peptone may act as a desensitizer. It may be given intramuscularly (especially in children) or intravenously or by mouth. In the use of peptone it is unnecessary to determine by skin tests the exact protein that is the antigen. The injections are given slowly so as to avoid any reactions.

D. Grant Campbell

PEDIATRICS

Nutritional Keratomalacia in Infants (4 Cases). Ross, S. G.: Amer. Jour. Dis. Child., Sept., 1921.

Keratomalacia was defined by de Schweinitz as ulceration of the cornea with xerosis of the conjunctiva. The word is synonymous with xerophthalmia, but as the most typical changes occur in the cornea, the former is the term of choice.

Ross reports four cases on account of the light thrown recently on the etiology of this disease. Only four cases were observed in the Johns Hopkins Hospital among 28,000 admissions in 30 years, but Ross recognized two in the past year. These four infants were from 3 to 6 months old and all showed:

1. Artificial feeding (condensed milk in all).
2. Extreme progressive malnutrition.
3. Hyperleukocytosis (30000).
4. Obstinate vomiting and diarrhœa.
5. Ulceration of the cornea.

Etiology. MacKenzie (1857) first noted the relation between corneal ulceration and malnutrition in infants. This relation was fully confirmed later, but etiologically this condition was not separated from that complicating many acute infections, smallpox, scarlet fever, typhoid, etc. Bacteriological tests have proven indefinite. Only in this century has the relation of special dietary factors to this disease been studied. Mori (1904) in Japan observed 116 cases, in all of which the food consisted practically entirely of cereals and vegetables. Cod liver oil proved a specific and Mori concluded the cause was lack of fat in the diet.

Czerny and Keller described a malnutrition resulting from a diet of carbohydrates and noted that keratomalacia was a frequent complication. They believed lack of fat and possibly of protein in the food was the cause. In much of the recent research in connection with vitamines, not only arrested growth but wasting and xerophthalmia were observed in rats. The eye lesions were cured by "fat-soluble A" vitamine (cod liver oil, butter, fat, etc.).

Bloch in Denmark in 1916 carefully studied 40 cases in which fats were almost absent from the food and he concluded that lack of the "fat soluble A" vitamine was the cause. He divided thirty-two healthy children into two groups of sixteen each. In group 1 eight cases of xerosis occurred, group II. remaining free from the disease. The diets were similar, but while oatmeal and rusks were given to group I., some whole milk was given only to group II., the only fat given both groups apart from this whole milk being margarine. Thus a human experiment en masse was carried out. The fat in the whole milk given had evidently protected group II. The treatment was at once curative and consisted of cold liver oil without change of diet.

The dietary history in Ross' cases is clear cut, all four children being fed on condensed milk, a food high in carbohydrate and very low in fat and protein. Probably we have in condensed milk a food inadequate in the " fat soluble A" factor.

Pathology. In none of Ross' cases was there a histological study of the eyes. Dotsch has described the histology in two cases. The conjunctival epithelium shows thickening in all layers, especially near the corneal limbus. The cells of the superficial layer were flattened and their nuclei stained poorly. Moderate leukocytic infiltration of the epithelial layer and submucous tissue was present. The cornea was ulcerated and microscopically the ulcers were seen filled with pus cells, fibrin and necrotic material. Surrounding the ulcers was a dense leukocytic infiltration. The corneal epithelium in contrast to the conjunctival showed no increase in the depth of its cell layers. Indeed, near the ulcers it had disappeared.

Friese and others found similar changes in rats. Many observers agree that the lesions result from a secondary infection due to a lowered resistance of the tissues.

McCollum and others have been unable to produce these lesions experimentally by the removal of any dietary factors other than "fat soluble A" and the lesion is always curable in rats by the addition of this substance.

Symptoms. The usual history in the infant is artificial feeding of low fat mixtures with excessive carbohydrates. In Ross' four cases the food in all was condensed milk, which has these characteristics. In older children too a marked lack of fat has been noted. Vomiting and diarrhœa hasten the malnutrition and the skin becomes dry and scaly. Hypertoxicity of the muscles may appear with retraction of the head and stiffness of the limbs. These children are very prone to secondary affections, bronchitis, broncho-pneumonia, rhino-pharyngitis, otitis, pyelitis, furunculosis. Eye symptoms develop late, the first change being dryness of the conjunctiva with loss of the glistening. Injection of vessels follows and the cornea is then attacked, especially in the lower half, which finally ulcerates and perforates with hypopyon and prolapse of the iris. A purulent inflammation of the eyes generally develops.

Prognosis. The prognosis is grave, but improves above the age of one year. The patient generally dies from nutritional disturbance and the eye lesion is an index that this is far advanced. In one of Ross' fatal cases the eyes healed under cod liver oil. The late appearance of keratomalacia makes it difficult to recognize the disease early.

Treatment. The chief indication is to give the child sufficient animal fat containing the "fat soluble A" factor. Breast milk is the ideal food. Cod liver oil should be begun at once.

Summary. The type of nutritional disturbance is accompanied by a keratomalacia quite separate from the eye lesions found in infectious diseases and from other causes. It corresponds closely with "mehlnahrschaden" as first described by Czerny. Clinically and histologically this keratomalacia is very similar to the eye lesions produced experimentally in rats by a diet lacking in "fat soluble A" factor. The weight of evidence would tend to show that the human cases result from a lack of the same substance. If so, this nutritional keratomalacia in infants is the manifestation of a definite deficiency disease in the sense in which we now understand the term.

F. M. Fry.

The Role of Fatigue in the Malnutrition of Children. Veeder, Borden S.: Jour. A. M. A., Sept. 3, 1921.

The author is struck with the lack of stress laid on fatigue as a cause of this condition. The usual causes are said to be unhygienic conditions of living, poverty, overcrowding, etc., together with faulty dietetics. He finds that simply outlining diets and prescribing the ordinary amount of rest are not sufficient as a rule to improve the complaint, even when the unhygienic living conditions are corrected and the diseased tonsils and carious teeth are removed.

The child cannot maintain the sustained period of effort that the adult does but the sum total of the brief periods of violent exercise are much greater than the adult's day's work. When the child fails to relax between these violent efforts or when he has insufficient sleep at night his nutrition is bound to suffer. The strenuous exercise with the hard study of the school child are sufficient to cause trouble when combined with the social life so commonly adopted by the American child.

He cites cases illustrating this point and showing how the difficulty was overcome. One intractable case was put on the correct path back to health by being kept in bed for six weeks following on an acute illness. Exercises were subsequently supervised with a resultant gain of 12 pounds within the year.

A. B. Chandler

Comparative X-Ray Studies of the Size of the Heart in Healthy and Sick Infants. Lange, R., and Feldman, H.: Monatschr. Aug., 1921.

By means of direct x-ray examinations of the chests of a large series of infants and by making comparative measurements of the height of the diaphragm, the transverse diameter of the heart and that of the lungs, Lange and Feldman were able to arrive at a quotient by which to estimate the comparative size of the heart in health and disease. The method used was that described by Altstaedt in the Deutsch Med. Woch., 1919, No. 30.

They observed that in normal infants the transverse diameter of the heart to that of the lungs was as 1 is to 2, and that the height of the diaphragm had no influence upon the size of the heart. In normal new-born infants the heart was found to be comparatively small. Fifty-five per cent. of infants with exudative diathesis showed enlargement, while there was definite diminution of the size of the heart in infants with acute toxic intestinal disturbances. In chronic intestinal disorders, while some infants were found to have hearts of normal size, others were found with distinctly small hearts. These gradually became normal in size with the improvement in the general condition. Small hearts were demonstrated in a series of infants with pertussis.

A. Goldbloom

Treatment of Acute Poliomyelitis with Immune Horse Serum. Rosenow, Edward C.: Jour. A. M. A., Aug. 20, 1921.

Rosenow reports the results of treating 259 patients suffering from this disease. Each was given intravenous or intramuscular injections of his horse serum. The latter was prepared by repeated injections of increasing doses of freshly isolated strains of the pleomorphic streptococcus.

The good effects at the bedside were proportionate to the earliness of the injection. The improvement occurred with such regularity and in such marked degree when given in the pre-paralytic or early paralytic stages, as to exclude accidental occurrence. In these stages the death rate was nil, and the residual paralyses very low, in fact there were no residual paralyses when the serum was given in the pre-paralytic stage.

The serum must be given within 48 hours of the appearance of paralysis to have a decided value. Every hour of waiting after the onset of paralysis lowers the chances of complete recovery.

A. B. Chandler

Book Reviews

General Pathology: an Introduction to the Study of Medicine. By Horst Oertel, Strathcona Professor of Pathology and Director of the Pathological Museum and Laboratories of McGill University, and of the Royal Victoria Hospital, Montreal, Canada. New York: Paul B. Hoeber, 1921; pp. 357; price $5.00.

According to the author, this small book of about 350 pages is a "discussion of the development of the nature and processes of disease." The viewpoint is further outlined in the following terms by the writer of the book: "Pathology must be approached within the frame of modern biology . . . the history of a science is an essential part of it, and should be presented not as a simple recital of sequences but in the bearing and influence which one step of thought exerts upon the next . . . great emphasis has been put on the anatomic, histological, formal side from the dynamic standpoint."

The work is divided into two books, the first consisting of a discussion of etiology and the second of pathological anatomy, histology and pathogenesis. The first book is again subdivided into Part I. and II. Part I. contains sections 1 and 2 in the first of which bacteria and infection are dealt with; in the next are considered physical and chemical factors as the cause of disease. Part II. of book one is given over to the treatment of disposition and idiosyncrasy and heredity. Book II., consisting of about 160 pages, is devoted to pathological anatomy, histology and pathogenesis.

The historical treatment of the subject is on the whole quite good. There is, however, a conspicuous exception to this statement on p. 112 that: "our knowledge of acquired immunity was like all scientific knowledge originally—purely empirical.' The first observations were made by a country schoolmaster, Plett, near Kiel on the Baltic, who noticed that persons who had acquired cowpox became immune to smallpox. According to this, Edward Jenner has received more than his due reward from posterity and the German schoolmaster scant justice! The statement on p. 135 that "this acid agglutination (of Michaelis) is quite specific for bacteria" has not been borne out by much recent work.

There are a considerable number of typographical errors, as for example "erysipelatos" on p. 21, and "isotoxine" on p. 59.

The designations of bacterial species is not in harmony with that in use in recent bacteriological text books; and in general, the space devoted to bacteriology is too inadequate to render the book of any considerable value to the student of that subject, but too extended, possibly, for a book of general pathology. The same is true of the sections dealing with immunity. The most valuable work of Dale and of Weil on anaphylaxis is not even mentioned. Botulinus toxin and tetanus toxin are not similar in action, as is suggested in a foot note on p. 46. The mode of transmission is not clearly indicated and the importance of the flea as the insect vector is not pointed out. Tetanus toxin used for the immunization of horses for the production of tetanus antitoxin is not in practically any serum laboratories treated with iodine bichloride before being injected.

On the whole, this little book is in need of careful and extensive revision before the appearance of the next edition.

J. G. F.

Creative Chemistry. Edwin E. Slosson. p. 308. Illustrations 38; 8vo. Century Co., New York, 1921.

This fascinating and characteristically American book gives a vivid description to the lay reader of the achievements of modern chemistry. Doubtless it will go far to convince the American reader of the need for the protection of chemical industries in times of peace, of the importance of not wasting the by-products of industry and of the vast sums that can be made and saved by the work of the chemist in manufactures, agriculture and the arts. The author's mind is filled with the literature of the ages; he quotes Virgil, Shakespeare and Tennyson, but his American sense of humour leads him to introduce the slang phrase and the quotation, often in a fashion that is amusing because unexpected. The man who knows no chemistry is carried along in the wondrous story, is shown how the knowledge of chemistry saved Germany for years from defeat, how the opportunities and handicaps of the war made the United States for the first time thoroughly recognize the capital importance of chemistry, and the necessity of cultivating this science if it is to preserve its "place in the sun." What he says is true of Canada as well. Our farmers must employ more fertilizers, our manufacturers must save waste products to supply some of them, our miners will find the minerals needed and our chemists must be trained to direct the process. For the practitioner it is unfortunate that the author does not write a chapter on the "created" drugs, the product of chemical research, but there is enough of interest in this volume to recommend it to every one, be he patient or doctor.

V. E. H.

A Treatise on Fractures in General, Industrial, and Military Practice by John B. Roberts, A M. M.D., F.A.C.S , Emeritus Professor o Surgery in the University of Pennsylvania Graduate School of Medicine, and James A. Kelly, A.M., M.D., Associate Professor of Surgery in the University of Pennsylvania Graduate School of Medicine. Second edition revised and entirely reset. Octavo, 764 p., with 1081 illustrations, radiograms, drawings, and photographs Cloth $9.00: J B. Lippincott Company, Philadelphia and London.

This volume is, in a general way, a very excellent presentation of the fracture problem by men of wide experience, and may be accepted with a few exceptions as a safe guide to the treatment of one of the most important groups of cases with which the medical practitioner is called upon to deal.

The experience of the Great War has markedly emphasized the importance of proper methods of treatment, and has given a decided impetus to the study of fractures in general. Many of the newer methods that have been evolved by that experience are given due mention by the authors.

The illustrations are numerous and effective, but some of the x-ray prints might be improved upon.

Dr Roberts has always leaned towards conservatism in the treatment of fractures, but he admits that in some instances operative methods are indicated, and that then "perfect reduction and coaptation of the fracture surfaces should be performed by exposure of the line of break under thoroughly aseptic precautions by men trained to do this class of surgery."

One is rather surprised to note that after fully describing the advantages of the hyperflexed and fully supinated position for fractures at or about the elbow-joint in children, the authors then advise that the hand may be allowed to rest over the sterno-clavicular articulation of the opposite side. Again, one feels that sufficient stress is not laid on the advantages or necessity of anæsthesia in the reduction of "Colles" fracture.

It is somewhat of a pity, at least from the standpoint of Canadian readers, that a very excellent volume should be marred by a spirit of narrow provincialism which rather seeks to deprecate the work of others especially of English surgeons. For instance, the remark "It is probable that British surgeons had until the recent war obtained poorer results in the non-operative treatment of fractures than was the case in the United States" is a rare bit of impertinence. In discussing the statistics of operative as contrasted with non-operative methods, the statement is made "that a mortality of 57 in 11,946 cases (treated operatively) would be terrifying." Just where the "terror" comes in is difficult to see when it is acknowledged that in 11,946 cases treated non-operatively 129 died.

Whatever opinions one may have as to the methods evolved by Lane, he certainly should be given credit for a great stimulation to the study of fractures. Numerous "x-rays" showing the after-results of operative treatment by steel plates are given, and in each instance it is carefully explained that "Sherman's plates" were used.

Finally, most readers will be surprised to learn that "The injury Colles of Dublin described is in truth not a fracture of the lower end of the radius at all, but occurs in the lower part of the shaft. The term Colles Fracture should be discarded." This is in startling contrast to the dignified statement of Dr. Lewis A. Stimson: "Mr. Colles published his brief but accurate account of the fracture in 1814. He had never had an opportunity to dissect a specimen of the fracture, and speaks only of the symptoms and treatment."

E. R. S.

HYGIENE FOR HEALTH VISITORS, SCHOOL NURSES AND SOCIAL WORKERS. By C. W. Hutt, M.A., M.B., (Cantab.) D.P.H. (Oxon.); M.O.H. Metropolitan Borough of Holbournd, Second edition, revised and enlarged; 382 pages and 83 illustrations, with index. Methuen & Co., Ltd., London. Cloth, 12s. 6d.

"Intended to assist women training for public health posts and those carrying out voluntary public health work," says the cover announcement. Although entitled Hygiene, Dr. Hutt's chapter headings show as subjects, physiology (extremely condensed), food, clothing, personal hygiene, water, ventilation, warming, lighting, disposal of refuse, dwellings, school buildings, fœtal and infant mortality, supervision of midwives, care of infants and children, common ailments of school children, prevention of communicable diseases, elements of home nursing, first aid, duties of health visitors and school nurses, institutions of use to workers, useful sanitary legal knowledge, vital statistics (half a page), cancer (two pages), and advice to readers—a whole public health nurse's curriculum in outline.

Condensed as this mass of materials is into less than four hundred pages of large type, with many illustrations, it is necessarily a series of dogmatic statements.

From this side of the water, the mixture of subjects—a little hygiene, much sanitation, some therapeutics, and smatterings of all sorts of other things (including p. 64), how to take out ink stains!) seems rather incongruous and calls up sinister forebodings of mental indigestion. Far too condensed, technical and sketchy for the beginner, we can imagine that its principal use will be as a "remembrancer" for those already well trained in the fundamentals. In this country we have at present no type of public health woman worker actual or prospective to whom this book would—or should—appeal. Principles are far more valuable to our workers at the present time than practice, since the latter is almost hourly changing, improving, developing, becoming simplified, as well as covering new fields. Dr. Hutt's book is distinctly applicable to those who desire formularized statements to be learned by heart and to be mechanically applied. It will therefore always have a certain vogue, but a vogue which we hope will never become established in Canada.

Of many technical criticisms possible, a few may be cited. The chief defect is the great variety of subjects, superficially "laid down" without correlation or explanation. Relatively minor is the out of date treatment of ventilation, and of food values, written as though the advances of the last 15 or 20 years scarcely existed; and such unexplained and undeveloped dogmatisms as the following (p. 135): "The ceilings of dwellings should not be papered." (Why? What disease or disability to inmates will follow? It is an almost universal practice in this country, and without attendant mortality or morbidity!); (p. 91) "Adults give off 1600 calories per hour" (this makes 38,000 calories per day!); (p. 224) "In susceptible persons, if tubercle bacilli are present in the air breathed, the lungs are attacked; if milk containing tubercle bacilli is consumed, the intestine is attacked." This furnishes a very simple and memorizable epidemiological formula—alas that it should be as false as it is easy!

(p. 65) "Body lice and fleas do not multiply on persons who keep themselves clean: this (sic) is due to frequent changing of the underclothing." Apart from the delectable phraseology this sentence would make it appear that fleas do multiply on dirty humans, which is not true; they multiply in shavings and such like litter, not on the human body. The whole implication is misleading, for no amount of cleanliness will avoid infestation if there be efficient exposure; nor will any amount of uncleanliness accumulate infestation without such exposure. Contrast with this (p. 233): "Typhus never spreads to the inmates of well-ventilated homes."

The practice recommended in infectious diseases includes terminal disinfection, long since abandoned by the leading cities in this country; and a sheet soaked in disinfectant to be hung over the door of the patient's room (p. 166). "Disease and malnutrition of the mother rarely exist (reviewer's italics) apart from defective sanitation, over-crowding, bad housing, poverty." We cannot believe this statement of England, and we know it is not true in this country.

The reviewer would hesitate long before placing this book in the hands of Canadian nurses whether in training or post graduates. It is of no value whatever to a Canadian physician.

H. W. H.

THE HEART: OLD AND NEW VIEWS. By H. L. Flint, M.D., late Captain R.A.M.C. Cardiological Centre for the Northern Command, Physician to the Mansfield Hospital. With an introduction by Sir Clifford Allbutt. Pages XIII, 177, and 66 illustrations including 11 plates. Demy 8vo., 15s. net. London: H. K. Lewis & Co., 1921.

The author of this delightful volume has undertaken a survey of the doctrines from antiquity, following in chronological order the development of our knowledge of the heart and circulation. He has succeeded in presenting a most readable account of the older history of cardiology from early Sumerian times down to Corrigan, and follows this up with presentation of modern methods of study of the heart. Though there are full references to the literature and the recent work of Mackenzie, Lewis, Starling, and others, he has woven in much of his own experience during the war, and speaks as one who knows of what he writes. Methods of investigation are fully discussed and our modern viewpoints well exemplified. With a full discussion of the physiology and pathology of the various cardiac conditions, the principles of treatment are dealt with in a few short paragraphs. A tribute is paid to Osler's help and encouragement in the preparation of the work. It is a capital book for the physician.

J. H. E.

INTERNATIONAL CLINICS. Thirty-first series, vol II. Edited by H. R. M. Landis, M.D., Philadelphia, U.S.A., with medical and surgical collaborators in United States, England and Canada. 1921: J. B. Lippincott Co., Montreal, Que. Price $2.50 per volume or $10.00 for the series of four.

The medical and surgical clinics in this volume cover both diagnosis and treatment of a number of important conditions, making the volume one which will appeal to the physician in general practice, while the special articles on some unusual conditions are of great merit. The department of industrial hygiene is well edited and has become a most attractive one. We cannot mention individual articles when all are so good but must congratulate the editors upon the high standard they are maintaining.

J. H. E.

THE ALLEN (STARVATION) TREATMENT OF DIABETES, with a series of graduated diets. By Lewis Webb Hill, M.D., Junior Assistant Visiting Physician, Children's Hospital, Boston, and Rena S. Eckman, with an introduction by Richard C. Cabot, M.D. Fourth edition. Publishers: W.M. Leonard, Boston, 1921.

This is a practical book for "physicians, dietetians and patients." That a fourth edition has been found necessary since the first appeared in 1915 speaks for the place it has made for itself. It is a safe guide to the application of modern methods of treating diabetes, a disease whose mortality has definitely lessened since the introduction of the line of dietetic treatment here described. It is a book for the physician to place in the hands of his patient.

J. H. E.

THE AMERICAN YEAR BOOK OF ANESTHESIA AND ANALGESIA. Vol. II., 1917-18. F. H. McMechan, A.M., M.D., Editor. pp. 483 and index; numerous illustrations. New York: Surgery Publishing Co., 1920.

The exigencies and demands of the war are the editor's reasons for the late appearance of this volume of the year book. In both the science and practice of anæsthesia and analgesia there are many controversial points which require careful investigation and study. In the year book a number of fundamental studies find their place, and some of these are of exceptional merit. The advances made in these subjects in the surgery of war, form some of the notable contributions, while the editor has been convinced that the handling of anæsthesia and analgesia by the various Allied medical services was not what it should have been. The army anæsthetic methods which underwent considerable development and advance are now finding their application in civilian practice, for the practice of anæsthesia is rapidly becoming a specialty in the practice of medicine.

Local, spinal and sacral anæsthesia receive due attention. Your reviewer feels he cannot in fairness select any of the essays and contributions for special mention where the standard of excellence is so high, but extends his congratulations to the editor and expresses the hope that the year book will meet with the success it deserves and secure the support necessary for its continuance. There is a full bibliography of the pertinent literature and we find acknowledgment made to McGill Hospital Unit, Toronto General Hospital and this journal for courtesies extended.

J. H. E.

DISEASES OF CHILDREN. Designed for the use of students and practitioners of medicine. By Herman B. Sheffield, M.D., formerly instructor in Diseases of Children, New York Post-graduate Medical School and Hospital, and Medical Director Beth David Hospital, Consulting Physician to the Jewish Home for Convalescents and the East Side Clinic for Children. With 238 illustrations, mostly original, and nine colour plates. St. Louis: C. V. Mosby Company, 1921. Price, $10.00.

With so many excellent treatises on diseases of children available to the practitioner and to the student, one picks up the volume under review with some skepticism.

As a college text-book it does not appear to us to be suitable because insufficient space is devoted to the diseases of nutrition in infancy; only eleven lines are allotted to the consideration of vitamines. On the other hand the book will prove valuable as a hand book for the general practitioner who, in addition, has in his possession a good book on infant feeding. The illustrations are exceptionally good; e.g., facing p. 360 is a very fine coloured illustration of Koplik's spots. The descriptions of the Schick reaction for the detection of susceptibility in diphtheria and the post-operative treatment of pyloric stenosis are given in detail; emphasis is laid on the modern method of the treatment of patients suffering from cardiac affections and an outline is given of the graduate exercises used in the New York cardiac clinics for children. The chapter dealing with mental deficiency in children is well illustrated and simple mental tests for children from six months to four years of age are included. On the whole the book is a valuable contribution and will be of considerable help to the general practitioner.

H. P. W.

WHAT TO DO IN CASES OF POISONING. By W. Murrell, revised by P. Hamill. Twelfth edition, pp. vi. and 273; 32mo.; 4s. 6d. H. K. Lewis, London, 1921.

This invaluable little book should be in the possession of every practitioner. Further, he would be advised to have this new edition, which has been thoroughly revised, improved and brought up to date by a thoroughly trained man. The general advice in the introductory chapter is excellent and should be part of every practitioner's general knowledge. The ignorance of the profession in Ontario on the subject of poisoning, and the mistakes made by them in their handling of cases and in medico-legal evidence are extraordinary. The reviewer regrets that the author does not insist sufficiently on copious washing of the stomach with water; three or four washings are not enough. At least twenty pints should frequently be used. V. E. H.

Books Received

A Review of those which are considered noteworthy will appear in a later issue.

CREATIVE CHEMISTRY. Edwin E. Slosson. Century Co., 353-4th Ave., New York.

GENERAL PATHOLOGY. Horst Oertel. Paul B. Hoeber, New York.

NUTRITION AND CLINICAL DIETETICS. Herbert S. Carter, M.A., M.D., etc. Lea & Febiger, Philadelphia, Pa.

DISEASES OF THE SKIN. Oliver S. Ormsby. Lea & Febiger, Philadelphia, Pa.

INFECTIONS OF THE HAND. Allen B. Kanavel, M.D. Lea & Febiger, Philadelphia, Pa.

MOUTH HYGIENE. Alfred C. Fones, D.D.S. Lea & Febiger, Philadelphia, Pa.

THE EVOLUTION OF DISEASE. Prof. J. Danysz. Lea & Febiger, Philadelphia, Pa.

THE ALLEN TREATMENT OF DIABETES. Lewis W. Hill, M.D., and Rena S. Eckman. W. M. Leonard, Boston, Mass.

WHAT TO DO IN CASES OF POISONING. Wm. Murrell, M.D., F.R.C.P. H. K. Lewis & Co., Ltd., 24 Gower Place, W.C.1, London, Eng.

AUTOEROTIC PHENOMENA IN ADOLESCENCE. K. Menzies. H. K. Lewis & Co., Ltd., 24 Gower Place, W.C.1, London, Eng.

CLINICAL EXAMINATION OF THE NERVOUS SYSTEM. G. H. Monrad-Krohn, M.D. (Christiania.) H. K. Lewis & Co., Ltd., 24 Gower Place, W.C.1, London, Eng.

TREATISE ON FRACTURES IN GENERAL, INDUSTRIAL, AND MILITARY PRACTICE. John B. Roberts, A.M., etc., and Jas. A. Kelly, A.M., etc. J. B. Lippincott Co., Montreal, Que.

INTERNATIONAL CLINICS, Vol. II, Thirty-first Series, 1921. H. R. M. Landis, M.D., Philadelphia, U.S.A. J. B. Lippincott Co., Montreal, Que.

HYGIENE FOR HEALTH VISITORS, SCHOOL NURSES AND SOCIAL WORKERS. C. W. Hutt, M.A., M.D., etc. Methuen & Co., Ltd., 36 Essex St., London, W.C.2, Eng.

TRANSACTIONS OF THE AMERICAN UROLOGICAL ASSOCIATION. Williams & Wilkins Co., Baltimore, Md.

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MIDWIFERY AND THE DISEASES OF WOMEN, By John S. Fairbairn, M.A., B.M., F.R.C.P., F.R.C.S. About 1000 pages, $19.50.

The British Medical Journal says:—"It is eminently calculated to be helpful to the practitioner as a work of ready reference, and as its merits become known it is assured of a wide circulation and an increasing popularity. It is manifestly the outcome of a great deal of thought on the part of the Editor as to the actual needs of those for whose use it is primarily designed, as well as in the arrangement of the matter, which is in some respects unique. It is a mine of accurate information, and its teaching is based upon an enormous collective experience gleaned from practically all the medical schools of the United Kingdom. We conclude as we began by congratulating Dr. Fairbairn on a monumental achievement."

DISEASES OF THE SKIN, By Richard L. Sutton, M.D., Professor of Diseases of the Skin, University of Kansas School of Medicine. New fourth edition. 1133 pages, 969 illustrations, $10.50.

The British Journal of Dermatology says:—"Dr. Sutton's books are so well known and appreciated that nothing is wanting to recommend this new edition to those familiar with the earlier works. The illustrations are so numerous as to entitle the work to be classified as an atlas of skin diseases; in fact, there are few atlases which contain so complete a pictorial record of the whole field of Dermatology. The author and publishers are to be congratulated not only on having secured such a large collection, but on the excellence of their reproduction."

INDISPENSABLE ORTHOPÆDICS, By L. Calot, Chief Surgeon to the Hospital Rothschild, 1108 pages, 1140 illustrations, 2 vols. $14.00.

"The keynote of the book is cure without recourse to surgical operation. The author's methods are clearly explained throughout. The name of Calot is, of course, a guarantee of soundness, and his style is picturesque and vivid. The translation was admirably done and the illustrations can scarcely be excelled."

The Medical Press says:—"Dr. Calot's viewpoint in its new English guise loses none of its attraction, and every practitioner and surgeon should have this volume on an easily accessible bookshelf."

THE OXFORD INDEX OF THERAPEUTICS Edited by Victor E. Sorapuro, M.D., Ch. B., F.R.C.S., with over seventy contributors. 1144 pages, illustrated, $10.50.

This is truly one of the important books of the year for the general practitioner. It is broadly international in its character, and deals very specifically and directly with the all important question of treatment. The author's wide experience in both Great Britain and the United States, admirably fits him for an achievement which has been so successfully accomplished. Considering the vast amount of material, scope of its contents and the high standing of the contributors, the book is remarkably low in price. An unusually large advance sale has made this possible.

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REPRINTS TO CONTRIBUTORS: These may be ordered from the printers upon the form submitted with the galley proof.

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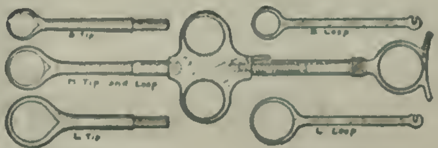

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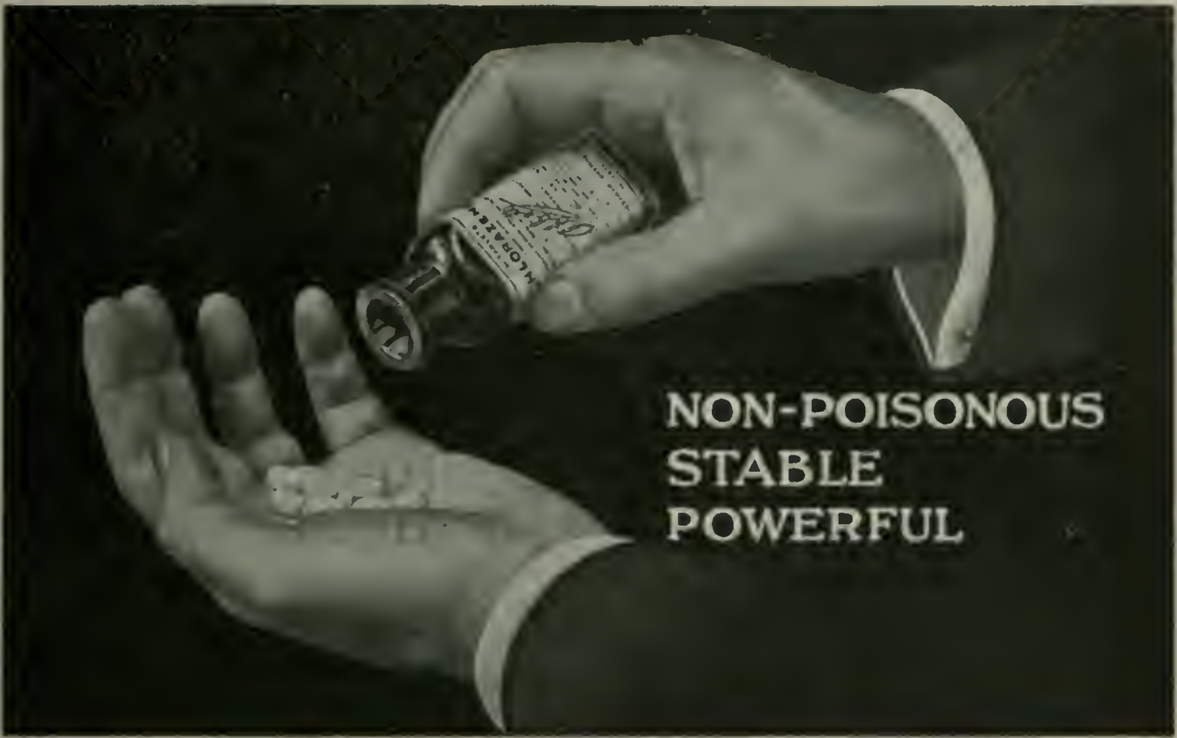

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The Canadian Medical Association Journal

Vol. XI. TORONTO, DECEMBER, 1921 No. 12

MALIGNANT DISEASE OF THE THROAT*

W. S. Syme, M.D., F.R.F.P. & S.G., F.R.S.E.

Lecturer on Diseases of the Throat and Nose, Glasgow University; Surgeon for Diseases of the Throat and Nose, Western Infirmary, Glasgow; Surgeon Ear, Nose and Throat Hospital, Glasgow.

I MUST first express my high appreciation of the honour you have done me in inviting me to make a communication before this Congress.

I have chosen the term, throat, rather than the more confined and technical terms pharynx and larynx because, in many ways, the problem connected with malignant disease of these parts concerns them both and, in some aspects, not separately but together. The only apology I make in taking this subject for a communication is that it is so large and so full of difficulties that it is not in the power of any single observer to carry the elucidation of the problems connected with it very far. I can only urge in extenuation of my temerity that the subject has for long pressed itself insistently upon me. I have been tempted to follow the example of many laryngologists, perhaps of the majority, and to acknowledge the undisputed title of the general surgeon to this territory. I have wished that I could convince myself that this was in the best interests of the patients, but I am not convinced.

The improvements in the methods of examination of the food and air passages and the introduction and familiarization of the direct methods have confirmed me in the opinion that, at any rate, the examination of patients suffering from malignant disease of the throat, the detailed diagnosis, the consideration of the suitability of the case for operation, and of its extent, if not the actual operative procedures themselves, should be the province of the laryngologist.

We are in the habit of dividing the pharynx, like Gaul, into three parts, naso-pharynx, oro-pharynx from the level of the palate to the level of the opening of the larynx, and larynge-pharynx from this level to the lower border of the cricoid where the pharynx becomes the œsophagus. This division is not merely academic, it has a special significance in the consideration of malignant disease. When we examine the statistics we find a very definite diversity in the sex-incidence of malignant disease of the three parts. As far as I know the tables prepared by Logan Turner of Edinburgh are the most instructive in this study. Shortly, we may summarize the matter thus: Malignant disease affects the oro-pharynx (tongue and fauces included) in the proportion of five males to one female, the larynge-pharynx, five females to one male, and the larynx five males to one female. We can, I think, understand, as far as the incidence of malignant disease can as yet be understood, the greater susceptibility of the male as regards the oro-pharynx and the larynx, but the reason for the greater preponderance of females in carcinoma of the larynge-pharynx is difficult to explain, though much ingenuity has been expended in searching for an explanation. Developmental tendencies, habits as to food, especially in the taking of hot drinks, differences in the method of breathing, all have their advocates.

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*Read before the Canadian Medical Association, Halifax N.S., July 7th, 1921.

Looking for a moment at the age incidence we find here, too, a difference in the sexes. The age is lower with females than with males and though this is more pronounced in the larynge-pharynx it is also sufficiently evident in other parts of the pharynx. I have seen at least three cases of cancer of the pharynx in women under 30 (in one the age was 23), but I have not met with a male affected under that age. Turner gives 45 as the average of females and 57 of males, with malignant disease of the larynge-pharynx. In laryngeal malignant disease, and especially in the intrinsic variety, the age incidence is decidedly higher than in pharyngeal.

Symptoms.—I shall not say much as to the symptoms of malignant disease of the throat. They vary with the site. Hoarseness, extending for more than a week or two, difficulty of swallowing, however slight, the more so if it is associated with loss of weight, pain on swallowing shooting, it may be, up into the ears, cough where no cause can be discovered in the chest, certainly demand a careful laryngeal examination. Don't be content with a diagnosis of sore throat, laryngitis, ear ache. The fixed idea is a curious phenomenon. I have known, we all have, a practitioner sailing merrily along with his diagnosis of laryngitis, even when the glands of the neck have become a hard mass, the weight has fallen from 14 to 8 stone, or their equivalent in pounds, and the case has gone beyond operation, even by the most optimistic, or if you will, foolhardy operator.

Examination.—This is where laryngologists come in, and from this point we are responsible for the case. It therefore behooves us to study the condition with the aid of all the methods and knowledge which, at the present day, are placed at our service. Examination with reflected light will naturally be our first line. If the disease is in the naso-pharynx, or in the lower pharynx or larynx, we shall use in addition the laryngeal mirror, the method now known as the indirect method. It has its limitations. By it, however, we may learn of the presence of a growth or of ulceration, of its position and of its naked eye characteristics, though, as a rule, not of its extent. We can, too, examine the condition of the cords, the presence or absence of fixation, and the position of the apparently fixed or paralysed cord, from which we may draw inferences as to the site of the suspected growth in the lower pharynx, be it understood, as well as in the larynx.

Direct Examination.—First a word as to malignant disease of the naso-pharynx. As we have seen this is the least common site, as far as the pharynx is concerned. Epistaxis, nasal obstruction, deafness at first in one ear (of the middle ear variety) with severe pain, are suggestive symptoms. In my experience there are not many patients in whom without or with local anæsthesia it is impossible to obtain a complete view of the naso-pharynx. There are several forms of electric nasopharyngoscopes. For myself I prefer Yankaeurs Speculum, and, certainly in any suspected case of malignant disease of the naso-pharynx I should not consider the examination complete without its use. While in any part of the pharynx and larynx early recognition of malignant disease is all important, in no part does this so strongly apply as in regard to the naso-pharynx, where it very quickly passes beyond the range of suitability for operation.

In dealing with growths and ulceration in the pharynx proper and in the larynx we have at our disposal two methods of direct examination, the suspension method and the method by means of tubes.

The suspension method of examination is, in my opinion, of inestimable service, indeed I never consider the question of operation, or of any other form of treatment, till this procedure has been carried out. As a rule cocaine anæsthesia, preceded by an injection of morphia, omnopon, or some such preparation, is sufficient, but where this is not I do not hesitate to make use of a general anæsthetic. The disease can then be examined, with its normal relationships, its extent can be more accurately defined, and, a matter of great importance, we can learn in many cases by palpation with a cotton tip probe whether or not the growth and mucous membrane are still movable, or whether the disease has penetrated into the deeper structures. A portion of the growth can now be removed for histological examination. I am sure it must have been the experience of all laryngologists to attempt to remove a portion of a suspected growth by the indirect method and subsequently to find that what had been removed was only a portion of œdematous tissue in the neighborhood of the growth and not a portion of the growth itself.

The use of the suspension apparatus obviates this difficulty. Certainly by its aid operative procedures of this nature in the lower pharynx and larynx are rendered more exact and easy. Indeed it was the criticism of an American cousin, when first he saw the method in use, that the worst of it is "'Tis so easy, any fool can use it." I don't agree with that in its entirety. That it does make the examination more exact at times was demonstrated to me by the case of a woman who came to my clinic. She had complained of pain on swallowing for some time. She had been seen by two laryngologists of repute, who declared, after examination by the indirect method, that there was nothing wrong, and yet, with the aid of the suspension apparatus, there was disclosed in the laryngo-pharynx, on the posterior wall, a growth about the size of a shilling, proved by histological examination to be malignant. It was afterwards removed by a lateral pharyngectomy. The method, of course, has its limitations. In a good subject, however, and in most subjects with a little manipulation, the larynx being pressed forward by a flat probe or spatula, a view of the pharynx is obtained down to the cricoid region, a common site for malignant disease. Then, too, in those subjects—and they are not a few—in whom an epiglottis retractor is required to obtain a view, sometimes even then an unsatisfactory view, of the larynx, of its anterior part at any rate, by the indirect method, the suspension method overcomes the difficulty. The anterior part of the larynx is admittedly the most difficult part to see. With the suspension apparatus in position and the epiglottis lifter carefully adjusted by pressure over the neck in front of the thyroid cartilage, the whole of the anterior part of the larynx can be brought into view. I prefer to use pressure with the fingers for this purpose rather than the mechanical device suggested by Killian and supplied with the apparatus. I show a sketch of the larynx prepared by a student of mine, of a case of early malignant disease of the left cord of which only an unsatisfactory view was obtained by the indirect method, but which as you will notice, became completely evident by this direct method.

The other method of direct examination is, as I have said, by means of the *tubes*. As I have already stated, my habit is to prefer the suspension apparatus in examination of the pharynx and larynx. Some throat surgeons however, possibly the majority, make use of the tubes by preference. I have been told that they have found the suspension method unsatisfactory and that only in a minority of cases have they been able to obtain a satisfactory view. That has not been the experience in my clinic. In using the tubes, both for the air and food passages, I prefer the left prone position with the head thrown back. When the disease is below the level of the upper margin of the cricoid a longer tube than the tube-spatula, an œsophagoscope in fact, is used.

The next method of examination, and also in my opinion essential, is a removal of a portion of the growth for histological examination. I know it used to be said that in very early suspected disease of the larynx, of a cord for instance, this might be omitted. Working with the indirect method this advice was, no doubt, justifiable. At the present day, where one of the direct methods can be applied, I doubt if it is. At any rate in two instances where I have followed it, one occurring before the introduction of suspension laryngoscopy, the other since, the growth removed by thyrotomy turned out to be tubercular. In both my opinion as to the growth being malignant was fortified by that of another laryngologist. No doubt my experience is not unique. Not only in the larynx but in the pharynx too it is sometimes quite easy to mistake a tubercular nodule for a malignant. I have recently had under my care a case of primary tubercular growth in the lower pharynx in a man of 46.

Though examination by *x-rays* is not so valuable in conditions of the pharynx as in those of the œsophagus, there are some cases where a growth is situated in the cricoid region where this method can give important information. Ordinarily the screen is used while the patient standing in the erect position swallows a bismuth or barium meal. I have found, however, that a better view may be obtained if this proceeding is carried out with the patient lying down. The meal enters the œsophagus more slowly. A satisfactory plate can also sometimes be obtained. A radiologist used to this branch of his work can give us very great assistance. Thus a condition which on examination with the œsophagoscope appeared to be operable is found on radiography to be quite beyond the scope of operation.

One more examination is required in suspected malignant disease of the throat before we can consider the question of operation and of its extent. This is careful examination for the presence of involvement of the *glands*, and that this may be conducted systematically we must bear in mind the association of the lymphatic glands with the various parts of the upper food and air passages. Not only is it necessary to think of those glands which can be palpated in the neck, but evidence of the involvement of the glands in the mediastinum must be sought for in the shape of pressure on the bronchi or veins and on the recurrent nerves.

Treatment by operation.—What Semon did in the way of limitation of operative procedures for intrinsic carcinoma of the larynx, surgeons like Trotter are doing in regard to malignant disease of the pharynx and of the extrinsic portions of the larynx. The aim of the present day is to extirpate the malignant growth and yet to retain the continuity of the food and air passages. The application of this principle, while it does not entirely do away with the complete removal of the pharynx and larynx, of both or either, diminishes the proportion of cases where this may be necessary. Indeed those of us who undertake the treatment of these cases have felt compelled in some instances to resort to these desperate measures, not I am bound to say in my experience with any great success, unless it be in regard to laryngectomy. It is not my intention to say anything about thyrotomy. That operation in intrinsic disease of the larynx has fully justified itself, as the records of many operators on both sides of the Atlantic and elsewhere can show. The number of cases in which laryngectomy is indicated must be proportionately much smaller. On the one hand the disease must have extended beyond treatment by thyrotomy and on the other hand it must not have progressed beyond the confines of the larynx and the very upper part of the trachea. That is to say it must not have progressed beyond the confines of the larynx and the very upper part of the trachea. That is to say it must not have extended into the food passages and it must be possible to divide the trachea well below it and yet leave sufficient to bring forward to attach to the skin. In one of my cases this latter point caused me most anxiety and for some time afterwards. I feared that the trachea might break away from its moorings. The result, however, is most satisfactory. It is three and a half years since the operation and there is no recurrence. The man is very well indeed, and unlike the rule in these cases, is very cheerful, works regularly, has developed a good, indeed a very good, pharyngeal voice and actually smokes. He has what is said to be rare in Scotsmen, the saving sense of humour.

There is no particular difficulty about the operation of laryngectomy. For myself I don't do a preliminary trachentomy. If there is any doubt as to the suitability of the case for laryngectomy, or rather if there is a possibility that thyrotomy, with extensive removal inside the larynx, may be sufficient, the larynx should be opened and an examination of the interior made. In performing laryngectomy after severing the muscles attached to the thyroid cartilage, close to the cartilage, and dividing the isthmus of the thyroid gland, the larynx and trachea are fully exposed. A search is then made for glandular involvement and surgical procedures adopted accordingly. The trachea is then carefully separated from the œsophagus. Carefully is used advisedly, as it is quite possible to tear the posterior wall of the trachea or the wall of the œsophagus during the process. The trachea is then cut across, either from before backwards, or from behind forwards, as far as possible below the growth, and yet sufficiently high up to allow of the lower part being brought forward and sutured to the skin. Some paring away, however, may be done after the trachea has been firmly anchored. The anæsthesia is now, of course, conducted by way of the open trachea. This part must be carefully isolated with gauze from the operation area. The upper cut end of the trachea is turned upwards and the windpipe separated from the œsophagus and pharynx and from the hyoid. A tube is passed through the nose into the stomach and the gap in the pharynx closed with strong catgut. The divided muscles and the fascia are drawn together in the middle line and the skin incision sutured.

The removal of the pharynx in addition to the larynx does not add much to the difficulty of the operation, though it does to the severity and to the subsequent distress of the patient. After the trachea has been divided the œsophagus is separated behind, a clamp applied, and the tube divided below it. The lower end is then passed below the sternal part of the sterno-mastoid and through a buttonhole in the skin flap where it is sutured. The patient then breathes through the severed trachea and is fed by a tube through the severed œsophagus. Stated thus, it is easy to understand his distressful after history if he survives the operation, and later, if he lives for any length of time, which only a very small minority do. That has been my experience, though of course, as is well known to us all, some few cases are reported where the most extensive removals, *e.g.*, of larynx, pharynx, glands, thyroid gland, enlarged blood vessels, have been followed by the survival of the patient for several years. Still, when all is said, a complete transverse removal of larynx and pharynx is an operation of great severity, followed, in most cases, by death, either directly from the operation or after a few months from recurrence, and the condition of the patient, during the time he survives, is unenviable.

This brings me to a consideration of the alternatives to this wholesale removal and to the surgical porcedures whose aim it is to remove the growth and yet retain, in some measure at any rate, the continuity of the food and air passages. In Great Britain, Trotter of London has been a pioneer in this matter. But of primary importance is early diagnosis, and it is up to us laryngologists (to use the forceful but inelegant Americanism which has been incorporated into the English language) to make use of all methods making for diagnostic precision. Then, too, a careful selection of cases improves the chances of success of the operation.

I do not intend to describe in detail the operative methods. These are adapted to growth in different parts of the pharynx. Tracheotomy is performed several days previously, or at the time of the major operation. The pharynx is packed, thus shutting off the upper opening of the larynx and also filling out the pharynx and making, as seemed to me, the determination of the extent of the growth, when approached by way of the operation incision, more easy. If it is done under direct vision, with the aid of the suspension apparatus, the packing can be done precisely, and at the same time one starts the operation with a definite mind's picture of the pharyngeal appearance. As Mr. Trotter points out, there are two distinct stages in the operation, the exposure of the growth and then its removal. Indeed in many cases there are three stages, where it is necessary to follow up the removal by some plastic procedure to restore the wall of the food passage and also by devising some means to safeguard the opening into the larynx if part of it has had to be sacrificed. The incision extends along the anterior border of the sterno-mastoid muscle practically from the tip of the mastoid to the clavicle. If the growth is in the lower part of the pharynx then the incision need not commence so high up and if it is in the upper part it need not go so far down. The dissection is carried out down to the constrictor muscles of the pharynx and to the wing of the thyroid, the muscles attached to this being divided. The sheath of the large vessels is then determined, and to minimise the risk of septic infection passing along it and also to lessen the risk of subsequent serious and even fatal hæmorrhage from ulceration of the vessel walls, the vessels are shut off from the operation cavity by stitching the anterior border of the sterno-mastoid to the aponeurosis in front of the spine. If the growth is in the lower pharynx or in the wall of the larynx the wing of the thryoid cartilage is now removed and a vertical incision is made through the constrictor muscles to expose the mucous membrane. If the growth involves the pharyngeal wall it may now be possible to outline it before opening the pharynx. A careful examination should be made, both of the extent of the growth and as to whether it is still confined to the mucous membrane or has passed beyond the cavity of the pharynx and invaded the adjacent structures. It is at this stage that disappointment so often arises. However detailed and careful the preliminary examination has been, it is in many cases impossible to determine the whole extent of the involvement, laterally, deeply, and in a downward direction. Just one example will show what I mean. A woman of fifty had a malignant growth in the lower pharynx. On examination and especially with the suspension apparatus it was seen to involve the right pyriform sinus and to extend towards the post cricoid region, but there was no interference with the movements of the cords. No involvement of glands or of structures outside the pharynx could be made out. By *x*-ray examination with a bismuth meal, its extent downwards appeared to be limited. This comparatively favourable view was supported by the general condition of the patient. She was in good health otherwise, and her body very well nourished Yet when the pharynx was exposed in the way I have described, it was found that the growth had invaded the right lobe of the thyroid gland, had travelled down the anterior œsophageal wall, invading the posterior wall of the trachea, and there were enlarged glands passing downwards towards the mediastinum. Removal was out of the question.

But to return to the operation. The pharynx is now opened by a vertical incision passing through the uninvaded mucosa where this is possible. Again a careful examination is made. The larynx can be easily rotated to examine its posterior surface Even at this stage the question of operation or not has again to be considered. Further surgical procedure is adapted to the exact conditions found, the rule being observed to cut wide of the disease (and this applies to the larynx as well as to the pharynx) at the same time taking special care not to make an accidental perforation of the posterior wall of the larynx or trachea when the position of the disease might make this a possibility. If there is glandular or other involvement the operation is extended accordingly. Then comes the examination of what remains. Two all-important questions call for answer. Has it been possible to preserve the continuity of the food passage and has the removal of the portion of the larynx been of such limited extent that it is possible to safeguard its opening? If it has been necessary to remove the lower pharyngeal wall in its whole circumference, then the œsophagus must be anchored to the skin, though it may be possible later to restore the continuity of the food passage. If a sufficient and continuous portion of the wall remains the anterior flap of skin is turned in and attached to the cut edges. A rubber tube is now passed through the nose into the stomach. Later when the skin flap has become united with the pharyngeal wall it is separated from its original attachment and turned in to complete the restoration of the pharynx. This part of the operation is by no means easy and it is only with difficulty and with patience that the resulting fistula is overcome.

It is, however, in regard to the larynx that the chief difficulty arises, at any rate in my experience, and in several instances it has seemed to me that it would have been safer if I had performed a complete laryngectomy, as it was found impossible to prevent food from passing into the windpipe. It is in such cases that a careful selection is required. Trotter endeavours to overcome the difficulty by stitching up the larynx under the root of the tongue so that when the tongue arches in swallowing the upper opening is covered. The great value of maintaining the windpipe, for purposes of voice, however hoarse or raucous, gives this part of the problem supreme importance. Then, too, the complete removal of the larynx may make it impossible to restore the continuity of the pharynx where an extensive removal of its wall has been part of the operation.

The problem then, as can be seen, is a very difficult one. Indeed every case must be decided on its individual merits. The difficulties again do not end with the operation. The after treatment and the nursing demand great care and attention, overcoming, if possible, difficulties as they arise. These cases make a great tax on our nursing staffs. In one of my cases the wound was healed and the patient dismissed from hospital under three weeks, but in most cases this period is extended it may be to months. The method, however, is, I am convinced, the method of the future. If the region of the tonsil pillars or root of the tongue is the part involved another incision is made joining the incision along the sterno-mastoid from the tip of the mastoid to the chin. The triangular flap thus made is turned downwards and forwards, the jaw is divided in front of the masseter muscles, and the two halves are forcibly retracted. A particularly good exposure of the tonsillar region is in this way obtained.

For growths involving the epiglottis a transhyoid incision is sometimes recommended. I have used it on one occasion and the exposure was good and the removal of the growth easy. At the same time the cases must be very few indeed where this incision can be preferred to the one already described.

Some exponents advise diathermy for some operable as well as inoperable cases. I have only used it for the latter. At first recommended only in the treatment of the primary growth, it is now used also, in many cases, for the glandular involvement, and those whose experience in its use is much greater than mine report some very gratifying results. It certainly seems to be likely to prove a valuable aid in the treatment of these distressful cases.

In the Scottish Universities, though not, I think, in all the teaching schools in the British Isles, and of those elsewhere I cannot speak, attendance on a course of laryngology is compulsory for students. We may therefore anticipate that these cases will be recognized at a much earlier stage and in this way reach the surgeon at a time when operation holds out increasing hopes of success. For after all, to end where we began, early diagnosis is the key which will solve the problem of malignant disease of the throat.

EXPERIENCES OF AN OTOLOGIST IN FRANCE, 1915-1919

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In the following paper I propose to give an account of the ear, nose, and throat conditions which came under my care while on active service in France from 1915 to 1919. A fair number of these were seen while at 26 General Hospital, Etaples, some at 7 General Hospital, St. Omer, but the great majority were seen after my appointment as otologist to the Second Army in 1918.

The class of case met with resembled closely that of the out-patient clinics of peace time. Very few war injuries came under my observation. This is explained by the fact that in 1918 the actual battle zone was too far off, and the Ear Centre was not in the direct line of evacuation. The effects of mustard gas poisoning were not met with either, as during the summer and autumn of 1918 the movements of the troops were too active for the effective use of gas. During the winter 1917-18 as battalion medical officer I had many cases in my unit during the end of the fighting in Flanders in the Houthulst Forest and Passchendaele sectors, but at that time I had no means of examining the larynx. In this area gas lesions were met with in the form of intractable skin burns, and in the respiratory system in the form of loss of voice. At one time about a quarter of the regiment was affected in this way.

My notes of 1415 cases contain some very interesting material. A statistical analysis of them shows up the relative frequency of some conditions and the rarity of others as contrasted with figures from civil practice. In military work ear conditions by far outweighed nose and throat conditions both in frequency and importance. Thus, in my series there were 1209 pathological ear findings as compared with 775 pathological conditions of the nose, nasopharynx and throat, a ratio of 1 to 0.64. If one compares these figures with those taken from an average out-patient clinic, such as those of the Ear, Nose and Throat Department of the Royal Infirmary, Edinburgh, one finds a marked difference. Thus, in the Royal Infirmary in three years there were 5382 ear affections as compared with 10627 nose, throat, and laryngeal cases, a ratio of 1 to 1.97. A large proportion of the 10627 is accounted for by tonsils and adenoids (3597), and in a civil clinic these are mostly children. Even deducting these tonsil and adenoid cases there are still 7030 nose and throat conditions, so that the proportion of the ear cases is still 1 to 1.3, which means that in the army the proportion of ear cases is almost exactly double what it is in civil practice.

Table of Complaints and Diseases

Complaints	
Deafness	558
Ear discharge	651
Pain in ear	259
Subjective noises	128
Vertigo	43
Nasal obstruction	103
Colds	53
Discharge	47
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Bleeding	155
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Hoarseness	25
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Cough	13

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Wax	105
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Acute antrum supp.	4
Chronic antrum supp.	5
Acute frontal sinusitis	13
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Atrophic rhinitis	12
Foreign body in nose	4
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Acute tonsillitis	31
Chronic tonsillitis	95
Pharyngitis	37
Laryngitis	52
Vocal nodule	4
Functional aphonia	15
Negative examination	47
Malingerer	9

With regard to the symptoms a glance at the accompanying table will show that discharging ears were the commonest condition for which advice or treatment was sought, and this was followed closely by deafness. Pain, subjective noises, and vertigo were much less frequent. The most common nasal symptom was obstruction, and the most common throat symptom was acute or chronic sore throat. Of the pathological conditions found chronic middle ear suppuration heads the list. Next come otitis externa, results of otitis, chronic middle ear catarrh, and wax. It will be noticed that otitis externa, under which heading are grouped boil, diffuse inflammation of the meatus, eczema and impetigo, occupies a relatively high place. Thus, in the Royal Infirmary figures already quoted there were only 261 cases of otitis externa to 4053 middle ear conditions (1 to 15.5). In my series the corresponding figures are 176 to 805 (1 to 4.5).

In the earlier years of the war contagious skin diseases, such as impetigo, were rife owing to the absence of organized attempts to deal with the problem of vermin. In 1915 and 1916 cases of severe impetigo of the ear were very common. In the later years of the war, however, these were not seen. Furunculosis of the ear was fairly common, as were also boils on other parts of the body. The extensive use of tinned foods, bad water, and difficulty in keeping clean may perhaps account for them.

A large part of my work was medico-legal. Soldiers were sent down to the Centre for a report on their hearing. In my experience malingering pure and simple was rare. By the word malingerer I mean a person with no lesion who deliberately simulates some disability. On the other hand most of the deaf patients whom I saw exaggerated somewhat their real deafness. To determine the exact degree of deafness was not of capital importance, but one had to determine it within certain limits. It was necessary to know whether a man could hear well enough for front line duty, or if not, whether he was fit for military duty of any sort.

I do not propose to describe in detail the various tests employed. It will suffice to say that they can be divided into three classes: (1) tests of sincerity, (2) reflexes, (3) tests requiring cooperation. The latter were only satisfactory when the patient was sincere. They include tuning fork tests and quantitative hearing tests.

Deafness and Fitness for Military Service

In the French army the minimum hearing requirements for armed service are whisper at 50 cm. or ordinary voice at 4 to 5 m. (15 ft.) For the auxiliary services a quarter of the above hearing distances are required. Anything less than that entitles to exemption or discharge. Cases with caries or polypus formation or cases with cholesteatoma or attic suppuration are exempted if they are not improved by treatment.

In the German army the minimum requirements for active service are a unilateral defect of not less than whisper at one metre. For the auxiliary services a hearing distance is required of whisper at one metre if bilateral, or if unilateral, hearing at less than one metre is accepted when the other ear is normal.

In the Italian army similarly the standard of hearing is whisper at one metre.

During the recent war the demand for men was so great that the standards of recruiting were considerably lowered. It was found by experience that men could make good soldiers even if they had some physical defect which would formerly have exempted them altogether. It may be taken as a good general rule that in the case of unilateral deafness the hearing should not be less than whisper at three feet, and ordinary voice at about ten feet in the deaf ear for front line work. If the deafness is bilateral whisper should be heard at six feet and voice at fifteen feet. For Class B, total deafness on one side may be allowed if the other ear is normal. In bilateral deafness ordinary voice should be heard at six feet.

With regard to the fitness of patients with chronic middle ear suppuration hard and fast rules cannot be laid down. Under such circumstances as obtained during the late war in France and Belgium, where medical attention and hospital treatment were always available many men could be taken for service with old-standing middle ear suppuration without much risk. However, large numbers of men with chronic middle ear suppuration were sent on front line service who should have been either kept at home or on the lines of communication. Active service aggravated the condition and serious complications were liable to supervene. If these complications were immediately recognized the matter would not be of such great importance, but it is our experience that lateral sinus thrombosis, extradural abscess, labyrinthitis, brain abscess, etc. were not generally recognized until too late. Those soldiers who were unfortunate enough to have chronic middle ear suppuration with caries were subjected to risks which might have been avoided. It may be argued that these men were exposed to death by enemy action in any case, but such accidents are unavoidable from the nature of military operations, but deaths attributable to neglect of chronic diseases should not occur. The kind of case that is dangerous is that with granulations and polypi where drainage is insufficient. Cholesteatoma in the attic is particularly dangerous. Cases with a large perforation and little discharge are fit provided their hearing is up to the standard.

The disposal of chronic middle ear suppuration cases during the war was a great problem. The wastage from this cause alone was enormous. Numbers of soldiers running into thousands were constantly going from hospital to convalescent camp and back to hospital again, sometimes for months at a time and receiving little or no treatment and performing no useful work. Many were classed as P.B., but the numbers of P.B. men were so great that it was difficult to keep them usefully employed. It would have been much wiser to have discharged many and have put them to munition making, for which they were perfectly fit, or to have them resume their civil employment, where in all probability they would at least be self-supporting and not an additional burden on the public purse. A ruthless comb out of the fit men in the munition factories would probably have yielded large numbers of useful men to take their place.

It is a fact greatly to be regretted that Otolaryngology was not officially recognized as a speciality during the war in the British army. It was not till the later stages of the war that special centres for ear cases were created and put in charge of recognized otologists. This was done only after great insistence by the various consultants to the armies, and even then the equipment and organization were very inadequate. Neurological and eye cases could be sent to special hospitals at the base or in England, where expert service could be obtained. Serious ear cases on the other hand were very often sent to some small country hospital, where they received no treatment by specialists, with the result that their healing was delayed indefinitely.*

It is to be hoped that if we are ever unfortunate enough to be again drawn into a conflict like the late war we may have an efficient organization for the treatment of ear cases, which could begin to function immediately. This is only possible if some representative body of specialists will insist on the proper recognition of the specialty by the army medical authorities, and work out a scheme by which otologists should be stationed in various easily accessible hospitals, so that any patient requiring special treatment could get it. Ear cases when sent to the base should always be sent to an otological centre so that the results of any previous treatment should not be spoiled through neglect.

At the Second Army Ear Centre we took into hospital for treatment all acute ear conditions, *e.g.*, boils, acute middle ear catarrh and suppuration, mastoiditis, etc., and those chronic cases which were likely to show rapid improvement. Aural polypi were removed and the ears treated with syringing and medicated drops. In some instances intratympanic syringing was used with beneficial results. Most of these men were returned to their units with the ears dry and the hearing improved. Others did not dry up entirely, but with few exceptions were improved enough to return to their units.

In the matter of operative treatment, it was felt that the radical mastoid operation should not be performed unless the indications were very strong, such as pain, or other signs of impending danger. The radical mastoid was very unsatisfactory in military practice as it was rarely possible for the operator to supervise treatment till its completion. This was possible only at the base or in England. We performed such operations therefore only in cases of urgency. Wertheim of Breslau (1) collected 100 radical mastoids operated on during the war by various surgeons.

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* These remarks apply only to the R.A.M.C. and A.M.S., not to the C.A.M C , which was, I believe, very well organized in respect to special treatment facilities.

He found that in 48 of them the ear was still discharging and there was no question of cure. In 51 the ear was practically totally deaf (whisper at less than ¼ m.) In 80 per cent. whisper was heard at not more than one metre. These results are not to be compared with those obtained in civil practice, where the operation is fairly satisfactory. In a series reported by J. S. Fraser and myself (2) 85 per cent. were dry. As regards hearing 68 per cent. were improved, 18 per cent. remained the same, and in 13 per cent. the hearing was diminished. In the series of Fraser and Garretson (3) 50 per cent. were perfectly dry and free from discharge, adding cases slightly moist but not discharging, 66 per cent. The hearing in the majority of cases was slightly improved but the hearing before operation was generally already extremely poor.

Again, even if a perfect cure results from the operation the duration of convalescence is so long that from the military point of view the time spent does not compensate for the possible slight increase in efficiency of the soldier. We were not so much concerned with the ultimate health of the patient as his immediate future, for it must be remembered that the primary function of the medical service in war time is to keep the ranks full.

In the French army, where there were large otological services, a considerable number of operations were done on selected cases with the idea of rendering men permanently fit in that respect and returning them to the line. These operations were mostly of the modified radical type of Heath or Bondy in cases of attic suppuration with good hearing. A cure was obtained in 50 to 70 days (4). Conditions in the French army were more favourable for this kind of treatment, as the patients could be kept under observation by the surgeon till the treatment was completed.

A healed radical mastoid is no bar to military service provided that the hearing is normal in the other ear. Fourteen old radical mastoids and two modified radicals were seen by me at the Centre. Their operations dated from 1 to 12 years previously. The average period was 4.7 years. Of these 16 cases 6 were clean and dry, two contained wax but were otherwise clean, while 8 contained pus and granulations. The hearing was noted in 7 cases. In one dry case whisper was heard at 9 feet, but in the rest ordinary voice was heard at less than two feet, and in the majority of these only at the ear. That is to say, in 6 out of 7 the ear was functionally useless. In the army we would naturally come across those cases with the poorest results, so that these probably do not give a fair impression, and besides, the general conditions of active service with bombardments and other forms of annoyance would all tend to aggravate the existing deafness.

Among my cases of chronic otitis media there were 18 cases of attic suppuration with perforation of Shrapnell's membrane. Of these 3 had dried up, Headache or pain in the ear were noted in only 5. The hearing varied from ordinary voice (CV) 3 inches to 15 feet. The average distance was a little over 5½ feet. These cases were all treated by conservative methods. Syringing followed by instillation of either H_2O_2 or alcohol was used in all cases, and in some lavage with an intratympanic cannula. Good results were obtained by these means. In one instance large masses of cholesteatoma were wa shed out, after which the ear dried up completely.

One case of attic suppuration is not included in the above numbers as the perforation was not in Shrapnell's membrane but in the posterior part of the drum membrane proper.

Pte. W. Admitted 3-10-18 with history of discharge from the right ear for a year. His ear had discharged some time before also. Had had a feeling of stiffness and weakness of the right side of the face for three months. Had pretty constant headache on the right side. Examination showed copious purulent discharge in the right ear with posterior perforation and polypus Left drumhead atrophic. Air bubbled through the perforation on auto-inflation. There was some drooping of the right side of the mouth. Nothing to note in the nose or throat. Whisper was heard at 14 feet right, ditto left. The polypus was removed from the right ear, and after removal a probe could be passed up into the attic.

7-10-18. Still copious discharge of pus; caloric test R produced horizontal and rotatory nystagmus to L in 20 seconds; pneumatic test negative.

12-10-18. Pus more copious; hearing worse (whisper 11 feet); weakness of face more marked.

26-10-18. As there was no improvement in the amount of discharge or headache and the facial paresis was becoming more marked operation was decided on. Modified radical operation; cortex sclerosed; antrum contained pus and cholesteatoma. Aditus and antrum were opened up and the bridge was pared down very fine and removed without disturbing the membrane or ossicles. Meatal flap cut and cavity packed.

3-11-18. Tube patent today; air can be blown through and fluid syringed through to throat.

18-11-18. Cavity almost dry now. Whisper heard at 14 feet.

22-11-18. Face much improved; ear nearly dry. Patient evacuated to base.

Gun and Concussion Deafness

In this class are grouped firstly those who complained of deafness due to a definite explosion of shell, bomb, etc., and secondly those who were becoming gradually deaf from continued exposure to loud noises. Very large numbers of patients complained of deafness which they attributed to the noise of the guns. However, on examination they were generally found to be suffering from a very chronic middle ear suppuration. It is of course probable that some increase in deafness is likely to result when a patient with a large perforation of the drum is repeatedly exposed to heavy concussions as in firing heavy artillery. It was very common in gunners to get a history of previous otitis media which had dried up but had come back when on duty with the guns. It is reasonable to suppose that a cicatrix would be very liable to be ruptured by the shock of the firing of heavy guns, as the concussion wave from the discharge of most of the heavy howitzers and the long range guns is enough to blow out a candle 100 or more yards away.

Of my cases there were 26 in whom the deafness was wholly or partially due to gun fire or shell explosion. Of these 26 sixteen attributed their deafness to single shell commotion. The second group of 10 had been affected by continuous loud noises and were for the most part gunners. Six cases were probably psychic deafness. Two of these were apparently absolutely deaf, and two others almost totally deaf. The vestibular reactions were normal. It was very difficult to decide here whether we were dealing with malingering or hysteria. Such cases are very difficult to treat by suggestion on account of the difficulty of approach. The general opinion of those with extensive experience of such cases is that absolute deafness is generally functional. It is unlikely that a shock, which leaves the vestibule unaffected, is at the same time severe enough to cause total destruction of the cochlea and end-organs.

In most of the cases of the second group, that is, those exposed to continuous loud noises, there was shortened bone conduction and a positive Rinne test. It must however be noted that the tuning fork results must be accepted with reserve, as it is natural for a person who has something to gain by appearing to be deaf to give answers which form a fairly typical picture of nerve deafness. However, four showed hæmatomas of the drum and two others showed some delay in the response to the caloric reaction on the affected side. Blumenthal (5) found in patients with healed gunshot wounds of the head that the hearing was affected in 50 per cent. Bone conduction was shortened in 91.8 per cent., but this shortening was only partly in proportion to the degree of deafness, and was found in 84 per cent. of cases with normal hearing.

With regard to the pathology of labyrinth commotion it has been shown experimentally by Prenant and Castex (6) in guinea pigs and rabbits that explosions caused dislocations of the cells of Corti, especially in the basal coil, hæmorrhages into the scala tympani, degeneration of the cells of the spiral ganglion, and ascending degeneration of the cochlear nerve. The vestibular organs were unaffected. J. S. Fraser and J. Fraser (7) have shown that in warfare injuries to the ear hæmorrhages take place in the middle ear, cochlea and internal meatus. In this connection I would like to bring up a point which bears on the mechanism of such injuries. While on duty in a small town in France, which received considerable attention from enemy aviators, I had ample opportunities for observing the effects of high explosives on buildings. It was a striking fact that when bombs had exploded in a street the window glass and even the shutters of the houses were burst *outwards*, except in those instances where an actual missile passed through the windows. Apparently there is a sudden wave of negative pressure following the explosion. It is reasonable to suppose that the effect of this negative pressure on the ear would be to cause a rupture of the smaller vessels.

With regard to the pathology of noise and occupational deafness it was shown many years ago experimentally by Wittmaack, Siebenmann, Yoshii, and others that prolonged exposure to loud noises of a constant pitch caused degeneration of the end-organs in certain parts of the cochlea corresponding to the pitch of the sound. Low pitched tones affected the apical coil, high-pitched tones the basal coil, and medium-pitched tones the middle coil. Rodger (8) showed that boilermaker's deafness in the earlier stages showed a defect only in that part of the tone scale which corresponded with the prevailing loud noises. Later the deafness spread up and down the scale. Wittmaack (9) in a subsequent paper found experimentally that the lesions caused by air-conducted sounds remained stationary and did not spread, but that the progressive deafness was due to vibrations conducted from the floor through the bones. This produced a degeneration in a part of the cochlea different from that affected by the air-conducted sounds.

I saw so few cases of rupture of the drum membrane that no conclusions could be drawn from them.

Among some of the more unusual ear conditions were three cases of latent purulent labyrinthitis. One of these had a large extradural abscess and lateral sinus thrombosis in addition, and has already been reported in a previous paper (10). There was also one other case of sinus thrombosis and one of otitic meningitis.

I also saw two cases of facial paresis and one of facial paralysis. One case of paresis involving the mouth was due to an acute mastoiditis with infection of the deeper tissues of the neck. After clearing out the mastoid cells and the abscess in the neck the paresis cleared up. The other paresis came on a week after a radical mastoid operation. The face became swollen and tender to touch after the patient had been out in a very cold wind. The condition passed off completely within a fortnight. One patient came in with complete facial paralysis on one side of two months' duration. No cause for it could be discovered though syphilis could not be positively excluded.

There was one case of Meniere's syndrome. A brigadier-general, aged 44, came 27-8-18 with a history of repeated attacks of vertigo. The first attack was mild and occurred in May, 1915. In 1917 the attacks became very severe. The last attack was on 19-8-18. It began at 11 p.m. and lasted until 2 a.m. The giddiness was so severe that the patient could not move nor even sit up. but had to lie upon the floor The only two positions tolerable were either flat on his back or prone on his face. He vomited repeatedly on the slightest movement and had the sensation of the surrounding objects moving round. There was no headache. He is fairly deaf in the left ear. In 1916 he was greatly troubled with subjective noises in the left ear, but this is now becoming less troublesome.

Examination showed both ear drums normla and moving on inflation; nothing abnormal in the nose, pharynx, or nasopharynx. The hearing was three inches for conversational voice in the left ear with the noise box in the right ear; hearing normal in the right ear; Rinne positive R., negative L.; Weber not lateralised; bone conduction slightly increased; no spontaneous nystagmus. The patient reported that he had had a positive caloric test a short time previously and refused to have it repeated. He also refused to be rotated. The pointing test was normal on both sides. There was no tendency to fall on standing with the eyes closed and the feet close together. Reflexes were normal; blood pressure also normal according to Col. Miller. Capt. White reported that the eye showed small patches of choroiditis, such as might have been due to hæmorrhages. A specimen was taken for a Wassermann test but the patient was lost sight of.

One case of chronic middle ear suppuration had a positive pneumatic test or "fistula symptom." This was best brought out by closing the patient's ear and getting him to do a Valsalva inflation. No instruments were available at the time for doing a mastoid operation, so the case was treated on conservative lines pending the arrival of the instruments. In the meantime however the otitis media cleared up completely, but the pneumatic test remained positive. The patient was sent to the base.

Among the more interesting nasal conditions were found four cases of acute antrum suppuration, and five of chronic suppuration. Of the chronic cases one had a nasoantral polypus. Another somewhat unusual case of chronic antral suppuration with an acute exacerbation had very marked proptosis of the eye on the affected side with vision diminished to mere perception of fingers. After a radical antrum operation and removal of the middle turbinate the swelling receded and the vision came back to normal. ($\frac{6}{6}$).

Sapper B. Admitted to Eye Centre 29-8-18 with history of pain in left side of head for eight days. The left eye became swollen and closed two days later. He had also had some discharge from the nose. On admission there was considerable proptosis of the left eye with great œdema of the lids and conjunctivæ. Vision was only $\frac{6}{60}$. Patient was seen by me 30-8-18 with Capt. H. V. White, who reported that the proptosis was more marked and that there was more limitation of movement and some engorgement of the retinal veins. Could only count fingers. The second left upper bicuspid stump was very tender. The left side of the nose showed thick pus in the middle meatus. The tongue was furred. Both the ear drums were normal. The tooth was extracted but no communication was found with the antrum. The left antrum was punctured and copious foul pus washed out.

31-8-18. Caldwell-Luc operation. The antrum was full of foul pus; lining membrane much thickened and polypoid, almost gelatinous in consistence; roof of antrum dehiscent; orbital contents felt through the opening. Mucous membrane completely removed and a large opening made into the inferior meatus of the nose. The middle turbinate was also removed and was followed by a small gush of pus.

2-9-18. Eye swelling gone down considerably, no proptosis now. At 1.25 p.m. the patient had an epileptic fit lasting about five minutes. He had another at 1.40 p.m. lasting about two minutes. The limbs of both sides were equally affected.

11-9-18. The eye movements are now perfectly free and the swelling localised to the cheek. The wound of the mouth is still discharging much pus. There is still a slight headache.

17-9-18. The washings from the nose are now pretty clean. There is some supraorbital pain and tenderness on the left side still. There is still pus in the middle meatus, which evidently comes from the frontal sinus. Vision now $\frac{6}{6}$. Patient was sent to the base, while the writer was on leave.

There were two cases of broken nose, one of hæmatoma of the septum, one of abscess of the septum, and two cases of anosmia for which no cause could be discovered. I also saw two patients with old healed antrum suppuration.

One patient came on account of middle ear catarrh with frequent blockage of the tube. Adenoids had been removed a good many years previously with very little benefit to the ear. A firm white band of scar tissue was seen joining the Eustachian cushion to the posterior pharyngeal wall. This could not be seen with the mirror but only with a Yankauer speculum, by means of which a probe could be hooked round it. The adhesion was divided with scissors. The further progress of the patient is not known.

One rather unusual case of retropharyngeal abscess was met with. The abscess was seen and opened through the mouth, but it had also burrowed laterally and a few days later pointed behind the sternomastoid. When this was opened it was found that there was a large cavity behind the scalene muscles.

Pathological conditions of the larynx were very rare with the exception of acute and chronic laryngitis. One case of papilloma of the vocal cord was seen. One case had apparently a paralysis of the interarytenoid muscle. Several cases of functional aphonia were treated by suggestion with good results.

The most unsatisfactory phase of military work was that one saw patients for only a very short period and could only very rarely follow them up till their treatment was completed. There were many cases of great interest which passed out of one's sight and were lost altogether.

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WHAT DOES PUBLIC HEALTH ADMINISTRATION EMBRACE?*

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THE unfortunate illness of Dr. Hastings, who had expected to deliver the address on Public Health on this occasion, is much to be regretted not only on account of the absence thus necessitated of one so universally esteemed, but also because of the need for entrusting the address to infinitely less experienced and less competent hands.

The subject which Dr. Hastings had chosen has been appropriated by me without leave or license, and in full consciousness of my inability to give it the thorough and effective consideration it would receive at his hands. The scope of the subject is so extensive that only certain features which are not commonly acknowledged to come within the embrace of public health administration can receive more than the most meagre reference.

Although the field of public health activity has been greatly extended within the last few decades, we may still feel that the matters which principally engaged the attention of sanitarians in earlier years remain fundamental factors. Man is capable of much adaptation, and we have it on excellent authority that he wants but little here below, but he will always require air, water and food. Most of the phases of all but the more recent public health work really cluster around the endeavour to secure these essentials in proper quantity and quality. Thus in connection with the air supply we must give attention not merely to measures for the suppression of dust, smoke and noxious effluvia and the ventilation of buildings, but also to such other things as the cleanliness and drainage of the soil, and the orientation, general planning, type of construction, plumbing, heating and artificial lighting of our buildings. Similarly, we can scarcely dissociate the water supply from problems of refuse and sewage disposal, while in respect of the food supply we must give heed to all matters which may in any way impair its purity or nutritional value, at every stage of its production, transportation, marketing, and even its preparation and service to the ultimate consumer. The prosecution of such activities requires legal authority, laboratory investigation, engineering supervision, and a variety of other services, so that even the sanitary control of air, water and food is not so simple a matter as it is commonly supposed to be. And when we take into account the measures usually adopted in connection with the infectious diseases, which necessitate legal authority, laboratory study, police supervision, etc , and also consider the machinery required for the collection and compilation of vital statistics, while we have merely covered the public health field as it was cultvated until within comparatively recent years, it will be seen that a considerable variety of factors are concerned in its administration.

It thus becomes obvious that an intelligent appreciation of all that is involved in public health administration requires knowledge of a very wide range of subjects, including many which do not appear in the medical curriculum, and demands a more extensive knowledge of several of the basic subjects of the medical course than is required for ordinary medical practice. Specialization is therefore essential, and the personnel of well-organized health departments includes those whose chief training has been along other than medical lines.

In consequence of the work which has been done, principally along these lines, we are able to point to some very satisfactory results. For instance, the average duration of life in Great Britain is now fourteen years greater than it was so recently as 1850. A century and a half ago, 50 per cent. of the inhabitants of England died before reaching the age of 25, while 50 per cent. now attain the age of 54. A half a century ago the general death rate of England

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*Read before the Canadian Medical Association, Halifax, July 5, 1921.

and Wales was 50 per cent. greater than it is today. These figures may be taken as typifying the proven possibilities of health work along the standard lines which have been indicated.

Again, it has long been recognized that certain faulty habits, certain forms of occupation, certain conditions of temperature, climate or atmosphere, and a variety of other factors, mostly impersonal, have been inimicable to the highest standard of health, and such things have naturally been the object of efforts at administrative control. But it is only of late years that particular attention has been directed to the prevention of ill health which is resultant upon the remediable defects of early life, such as diseased tonsils, adenoids, dental caries and ill-nutrition, This has led to a great enlargement of the earlier efforts in connection with the physical examination of school children, originally undertaken for the purpose of more effectively controlling the communicable diseases but now being aimed at the discovery and remedy of all defects which may prejudice full physical development. Out of this has grown an appreciation of the need for going back of the school age, even to antenatal life, and endeavouring to correct any abnormality of function or structure which may be discovered. This extension of public health work cannot be expected to effect such notable reductions in the general death rate as have followed the more generally applicable procedures, for obviously the whole public cannot be reached by such specialized effort until very large budgets become available and until there is a general willingness to accept such ministrations. But its importance must be obvious to all; its bearing is not merely upon the future health of children as shown by the remarkable experience of New Zealand, where the infant mortality rate, formerly about 120 per thousand births, has been reduced within a few decades to less than 50 per thousand births.

This form of work has brought forward *the public health nurse*, whose advent is perhaps the most notable event in the recent history of public health achievement. Her work has proved invaluable in many ways; perhaps more particularly in carrying instruction on the preservation of health into the homes of those who most need it. She is brought into contact with a large variety of social problems, and the co-ordination of her work with other phases of community welfare has become one of the most promising even if it is sometimes one of the most difficult problems of health administration.

An outgrowth of this development is the *health centre*—an institution which is designed not only to provide appropriate treatment for the defects found in those in necessitous circumstances, but also to facilitate the study of the social problems involved, and to further the necessary instruction of groups of individuals to whom the health nurse ministers. So, in addition to the infectious disease hospitals, which have long come under the health authority, and to the tuberculosis hospitals, which are a more recent acquisition, the health centres have now become a factor to be considered in health administration.

Having in this way given some attention to the younger members of the community, we must now listen to the cry of the elders. The *general death rate* has been much reduced almost everywhere, but this is because of improvements effected in the earlier years of life. In the age groups above age forty, the tendency on this continent is to a higher rather a lower mortality, and those of us who have passed that age are naturally apprehensive and wish consideration. Such organizations as the modest Live-a-little-longer Club and the more ambitious Life Extension Institute have aroused the expectation that health administration will soon embrace activities aimed at the prevention of the vascular degenerations and other conditions which account for the increasing mortality rate in the higher age groups, so there are possibilities of an enlargement of responsibility in this direction. Meantime, however, other interests have been pressed by various voluntary organizations which have been devoting effort to one or another feature of the apparently limitless field for those who are desirous of effecting social betterment. There are few of our social problems, —poverty, degeneracy, vice and crime—so deterrent to community and national progress, which are not intimately associated, either etiologically or sequentially, with ill health. Out of this realization there have developed some special activities (industrial hygiene, social hygiene, mental hygiene, etc.) which are gradually becoming absorbed into the general health programme and adding to the difficulty and complexity of administration.

In illustration of the extent of the present day conception of what constitutes investigation of public health problems, I may be permitted to refer to one or two of the vast number of studies now being made. We have amassed a large bulk of statistics which purport to show the influence of occupation upon health. These, however, have come to us from a great variety of sources, not always untinctured by the personal bias of the observer, not always collected with the keen attention to analytical detail which is essential to really informing statistics, and not always representing the whole truth. While certain trades are classed as particularly unhealthy it may be largely because those engaged in these trades are singularly ill-adapted to them or because local conditions, often quite remediable, such as bad housing, defective nourishment, special encouragement to intemperance, play a part more or less considerable in the determination of the high morbidity and mortality rates. There is really great need for a much more comprehensive study of such occupations than has yet been undertaken.

Anthropometry.—Limited as our knowledge is in respect to the practical application of anthropometry to the possible and perhaps probable influence of any given occupation upon the health of any given individual, it is not unreasonable to suppose that with due consideration of racial characteristics and inherited physical race or family traits, anthropometric data may have a bearing upon organic defects which, properly interpreted, would be of great value in the selection of men and women for various kinds of work. And this thought recalls to mind the oft-repeated observation that certain localities furnish men and women of particularly fine physique, while other localities give antithetic results; an observation which was frequently confirmed by the experience of recruiting officers during the war. We have been attributing this in the main to the influence of environment and heredity, but the matter has been given only superficial consideration. Is this not a matter of sufficient importance to warrant elaborate and careful study? Then, too, it is a commonly held belief that certain racial admixtures produce offspring of better than average type. Should we not have definite knowledge of the possibilities of improving the human stock in this way? These lines of research are suggested merely to indicate a few of the many fields which lie open to investigation with fair promise of the discovery of much material which would be practically useful in the prosecution of public health work.

The Organization.—We have talked much lately of reconstruction. As a matter of fact we really mean construction. To my mind there is no more promising form of constructive work than that which aims at building up a virile and resourceful people.

It is less than a hundred years since British armies were engaged in a very serious enterprise in the Crimea. You will remember that for some time the outlook was not very encouraging. In the first year's campaign the disease death rate was frightful, and the wounded died in great numbers.

Then a certain lady was commissioned to go out to the scene of action to minister to the wounded. She did more. She made conditions in the hospitals sanitary. The death rate amongst the wounded was reduced from 25 per cent. to 2 per cent. This was, I think, the first instance in which the principles of sanitation were really applied to a military expedition. I wonder how many can at this moment recall to mind the name of the British general to whom the capture of the Redan is credited. I wonder how many cannot recall the name of "The Lady of the Lamp." Lord Raglan did more for Britons than to give them a name for a particular style of overcoat, but Florence Nightingale has a firmer place in our affections than generals more distinguished than the conqueror of Malakoff and the Redan. Her work was purely constructive; it is such work which is of the greatest benefit to mankind.

We spent large sums of money on the medical services of our armies, and the saving in lives and in the health of our men was enormous. Very likely there was some wastage of money, but that is surely better than wastage of men. The need for haste at that time made full consideration of the various procedures impossible; we may proceed with greater deliberation and greater attention to economy in connection with the preventive measures which are applicable to peace times. But the longer the deliberation, the greater will be our loss in life and in efficiency. We have reached a time in our National career which is undoubtedly most critical. If we take the floo tide we may be led on to fortune. It will surely be disastrous to wait for the ebb, which would inevitably carry us out to the ocean of oblivion. The future of Canada lies in our hands. Never before did so much responsibility rest on the individual Canadian. It is the plain duty of each one of us to give his very best effort towards making Canada truly great. What is done now and in the immediate future will have a tremendous influence in determining the whole after history of our dear land. Let us see to it that our Canadian people are not hampered by the inefficiency which ill health so commonly engenders.

Attention should be given to the conservation of health for the sake of the individual. It is a matter of concern to you and to me, to your families and to mine. Attention should be given to it for the sake of the community. Many a town has failed to progress because of the handicap imposed by ill health upon its inhabitants. But most of all should attention be given to it for the sake of the nation. As Patrick Henry said: "I have no way of judging the future but by the past; no lamp to guide my feet but the lamp of experience." From the history of the past we may judge what our history may be. Nation after nation has risen, excelled, declined in consonance with the physical and moral health of its people. Burkart states it very concisely: "Sanitary, civic and moral decadence was the worm at the root of every discredited and submerged civilization of the past." All too often wars of conquest have taken soldiers of victorious armies into countries where they acquired infection and whence they returned to spread amongst their own people pestilence which has ultimately caused their downfall. Egypt, Greece, Rome thus came in turn under the dominion of malaria and the plague, and to these conditions primarily the decline of these great nations is to be traced. And, according to Vaughan, it has been repeatedly noted that "in the presence of widespread contagion mankind in the mass tends to revert to the barbarous state." The historian Niebuhr wrote that almost all epochs of moral degradation are connected with great epidemics. Writer after writer has expressed similar views. Gasquet, an abbot president of the English Benedictines, in his history of the black death observes: "The immediate effect on the people was religious paralysis. Instead of turning men to God, the scourge turned them to despair, and this not only in England, but in all parts of Europe. Writers of every nation describe the same dissoluteness of manners consequent upon the epidemic."

Disease, dissoluteness, vice have sapped the vitality of the great peoples of the past, and have led to their ultimate downfall. "Where there is no vision the people perish.' We must appreciate the handicap under which we will labour if we do not advance in the matter of health conservation at least as rapidly as the nations with which we must compete. Our success in the struggle for a place among the great peoples of the world depends upon the possession of that acumen and resourcefulness which can only be attained by those who are in the most vigorous bodily and mental health. Let us then have clear vision, and give attentive heed to those things which are fundamental in securing for the people of Canada every opportunity for the fullest development of physical activity, mental vigour and moral strength.

Alvarenga Prize.—The College of Physicians of Philadelphia announces that the next award of the Alvarenga prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about three hundred dollars, will be made on July 14, 1922, provided that an essay deemed by the committee of award to be worthy of the prize shall have been offered.

Essays intended for competition may be upon any subject in medicine, but cannot have been published. They must be typewritten, and must be received by the Secretary of the College on or before May 1, 1922.

The Alvarenga prize for 1921 has been awarded to Dr. John W. Churchman, New York City, for his essay entitled: "Selective Bacteriostasis of Gentian Violet."

For further particulars apply to John H. Girvin, *Secretary*, 19 South 22nd Street, Philadelphia, Pa., U.S.A.

THE RELATION OF GENERAL MEDICINE TO MENTAL MEDICINE*

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THESE are strange uncertain times. We look about us at a world in flux. Unrest, distrust, and discontent are rampant. We seem none too sure of what we want and are disturbed. Doubtless we are passing through one of the great transition periods that have marked the world's history heretofore, but, bearing in mind that it is not in his goals, but in his transitions that man is great, we may, perhaps, be somewhat comforted and believe that these uncertainties do but constitute a physiological epoch.

Nor has the profession of medicine been immune to the disturbances mentioned. We, too, feel this discontent, we see in ourselves peculiar contradictions—a constant reaching towards the new and radical, albeit with more than a passing glance at old traditions and customs. The old perfections of the earth still hold a place in our hearts. And strange to say, some of the things that we would fain believe glitter like new gold, are found on close examination to be but sound old metal reburnished. In the past decade, medicine came its nearest to being an exact science. Exact in the sense that we were taught and expected to find in each sick individual a specific cause and a specific ear-mark in the form of diseased structure. Medicine demands facts based on things seen, felt, heard. The individual patient was, as it were, gone over with a fine-toothed comb, our desire being to demonstrate some bacterium, some change in blood, secretion or tissue that would explain completely that patient's distress. The methods of precision have been worked hard, and had we not grown to depend too much upon them, all would yet be well. But the seers of medicine cry out that in our mad rush for scientific data, we have forgotten that there is an art in medicine, that there is in it an intensely human factor that microscopes, colorimeters, etc., can never touch. One sees unmistakable signs of some discontent with the results of "laboratory medicine." We must grant that the laboratory has done much, but we know that it can never be all of medicine. You may ask what all this has to do with mental medicine, and I answer that I believe it is in this heretofore unfortunately isolated division of medicine more than in any other division, that the whole individual patient is being considered. Up-to-date psychiatry is making full use of the data of scientific medicine, but it has not forgotten that body and mind are inseparable and that disorders in one almost invariably set up reverberations in the other. It is an appeal for the consideration of this fact that I wish to make. The fair flower of medicine at this moment is surrounded by a variety of noxious weeds. Our would-be rivals, representing at best half-truths, make use, unconsciously often enough, of that keen understanding of the whole individual that should rightly be the most blessed attribute of medical art. The "Masters of Effrontery" have stolen and continued to steal a considerable portion of our most valuable possessions. Cults that still the fear of the sick by absolute denial of the existence of disease, or by direct promise of cure, do seem to supply something that many patients must have. Medicine seems to have lost sight of the sick man while busying itself with running down diseased gall-bladders, hearts or what not. Need we say that medicine must regain her own?

Let us look closely at the relationship of general medicine to mental medicine. The latter finds itself today almost an exiled specialty and this is not as it should be.

It is said that specialization is unquestionably essential for the rapid advance of knowledge in any new direction, but there is danger of a specialty being split off permanently by centrifugal action from the sphere in which it originated. This is apt to leave the specialty an isolated body revolving in a narrow orbit around its own subject, from which it ultimately ceases to draw much light or heat. For when the specialty gets very far removed from greater medicine, no matter how bright its original flame, it rapidly cools to the loss no doubt of both medicine and specialty. In the present relationship between general medicine and mental medicine, general medicine has no doubt been the greater loser. For while psychiatry, and by this I mean the treatment of mental symptoms whenever, wherever and in whatsoever degree they occur, is making use of practically all that general medicine has to offer, general medicine has woefully neglected the investigation and treatment of the mental elements in disease. It has failed, generally speaking, to realize that "Mind is the most intimate and personal of our possessions," that it "constitutes an organic structural part of our being." If it requires healing, if it has a definite relation to body, then can we deny that the physician must take it into account? We have been taught the embryology, anatomy and pathology of organs and tissues, but we have heard next to nothing on that of ideas and feelings. Three hundred years ago Burton, it is true, wrote his celebrated "Anatomy of Melancholy," and I crave your indulgence when I quote, for there is no more striking passage in that work than this: "For that which is but a flea biting to one causeth insufferable torment to another, and that which one by his singular moderation and well composed carriage can happily overcome a second is no whit able to sustain but upon every small occasion of misconceived abuse, injury, grief, disgrace, loss, cross or humor, yields so far to emotion that his complexion is altered, his digestion hindered, his sleep gone, his spirits obscured, his heart heavy and his hypochondries mis-affected; wind, crudity on a sudden overtake him and he himself is overcome with melancholy."

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*Read at the Annual Meeting, Canadian Medical Association, Halifax, July 5-9, 1921.

The classical conception of disease as set forth in text books is entirely based on a materialistic pathology. Altered function, in other words, symptoms, receive a physical, a bio-chemical or no explanation at all, treatment is confined to chemical reagents and drugs. And can we expect anything else when medical students receive practically no instruction in the detection and treatment of the mental elements in disease? They hear the advice to treat the patient and not the disease but they pay little attention to this since they are not told how it is to be done. Most of them, slowly, perhaps painfully and almost certainly unconsciously, discover a hint of it for themselves as they pass on through their professional lives. One looks in vain through text books on medicine and diagnosis for anything suggesting that a great field in the investigation of each individual patient lies beyond the scope of laboratory method. I looked through six standard books on diagnosis and found that on an average they devoted half a page to the discussion of mental factors in disease. Students come to their final examination with little notion of personality or the tremendous part it plays in the practise of medicine. Students certainly, and the majority of practitioners I fear, approach their patients determined to find "one specific and definite thing as a cause for a most complex condition."

In internal medicine intensive study is directed toward the individual organ or system. It is frequently necessary to pay attention to the way in which the organs are linked together by the central nervous system or by the glands regulating the bio-chemistry of the body, but no higher integration is attempted. The actual individual is seldom reconstructed for the purposes of the internist; much less the surgeon. Personality is a category that he does not use. So far as the study of personal factors is omitted, the study of the function of the individual organs is incomplete. Campbell, whose words these are, has shown well the part instinctive reactions, emotions and personal factors play in the genesis of some heart disorders. War-time experience brought this home to many. Many gastro-intestinal cases arise on a similar background and the myriads of so-called psycho-neurotics going from physician to physician, demonstrate the supremely important position that psychic elements occupy in the genesis of symptoms of disease. We may see in these, if we but look, the devastating effects, both physical and mental, of maladjustments of mind to surroundings. Theirs are minds not readily effecting that rapport with circumstances and environment that alone makes life normal, yes perhaps even possible.

This neglect of consideration for mental factors is in part the result of lack of training, in part due to lack of guidance by the recognized leaders of medicine, and in no small part, doubtless, due to indolence, impatience and hurry. The mention of psychic factors is so likely to bring down on one expressions of disapproval and irritation from one's brother practitioners, that strongly opposed views and radical attitudes are engendered. Those recognizing the psychic factors are almost forced to be extreme because of the necessity of defending their stand against those who ridicule the idea that certain mental and emotional attitudes towards life can ever interfere with health. We have seen as the result of this the gradual drifting apart of general and mental medicine. The ties have grown more and more feeble until they are all but broken. General medicine spurns mental medicine and mental medicine has no doubt become seclusive as the result. What we urgently need is a home-coming not as a prodigal but as of a child, who through former misunderstandings, gradually withdrew and lost contact with its parent.

In days to come mental medicine's great contribution to medicine generally will be recognized as the longitudinal section method of surveying the patient instead of the cross-section method—the survey of the whole individual, the mental and nervous as well as the obviously physical. We must know that contrary to a frequently heard dictum, all men are not created equal. Daily experience makes it plain that men differ greatly in their mental, moral and physical attributes, and yet we, in treating a sick man, have seen no reason to inquire into and allow for inherent instinctive tendencies, emotional disorders and volitional defects. Aside from the increased confidence and comfort that complete investigation gives to the physician, there is the strong practical value to be considered. A careful, even if not too prolonged, searching of family and past history may reveal constitutional traits and environmental mal-adaptations that can conceivably, and may actually, modify or initiate present complaints or symptoms. The physician or surgeon brought face to face with an odd group of indefinite complaints, gains valuable insight into the case when on inquiry he discovers that the patient's life is shot through with evidences of abnormal sensitiveness and emotional instability. He will not lightly embark on radical procedures in treatment without further probing and without satisfying himself on the whole question of "What is this individual trying to do?" Has he actual solid pathology that will account for all of his complaints? Has he no solid pathology at all or, as most frequently happens, has he a moiety of structural and functional change with a large cloud of abnormal mental reactions surrounding it?

So much then for the general appeal for a more thorough and searching consideration of the mental factors in disease.

We may refer for a few moments to yet another aspect of the question, and that is the presence of definite mental symptoms in cases of somatic disease. The occurrence of delirium in acute infections need not detain us. Everyone meets cases of this kind. But just in this connection we may mention an important type of mental disturbance which seems, as time goes on and facts accumulate, to be definitely and closely related to infection. I refer to the psychotic episodes of the puerperium. In the psychopathic hospital we have a very fair opportunity to observe such cases. There has not been a single puerperal case committed to a provincial hospital in Manitoba since the Psychopathic Hospital opened. We have noted, in every case seen by us, such signs of infection as fever, purulent discharge or leucocytosis. In looking back over the history of medicine we find that as the technique of midwifery has improved and sepsis grown less frequent, the acute mental disturbances have also grown less frequent. These are facts that point their own moral.

Few physicians recognize the fact that pernicious anæmia may be characterized or indeed ushered in by a mental upset. In one year four such cases have come to our notice and not all of them had the spinal cord signs. that we are accustomed to think of as the contribution of the nervous system to the symptomatology of the disease. Delusions of persecution and ideas of influence and reference are the outstanding mental features of such cases, and they apparently rise and fall with the well-known remissions of the disease.

Epidemic encephalitis has contributed a very fair number of cases, some of them decidedly atypical, the true nature of the condition only becoming apparent after careful investigation or prolonged observation.

There seems just now to be danger of the endocrine glands being considered guilty too often, but I am convinced that we regularly miss the significance of disorders of these organs in many obscure mental conditions. During the past year I published in the Journal the report of a case of myxœdema that for a time was incorrectly diagnosed dementia præcox. A more recent case showed with her psychosis evidences of pituitary and thyroid disorder. All symptoms disappeared under appropriate treatment, only to recur when through carelessness the treatment was neglected. The symptoms again disappeared with the recommencement of treatment. We know enough of the functions of the endocrine glands to be assured of the fact that they work together rather than separately and that they are closely connected with our emotional lives. In fact, one feels at times that they take part in vicious circles, pernicious activity being engendered by abnormal emotional demands and this same dysfunction acting toward keeping up or aggravating these same genetic conditions. Future investigation in this field holds much promise.

A few moments ago I spoke of the patient's personality as something to be seriously considered. Will you bear with me for a moment while I remind you that the physician's own personality is also an important factor? Scholastic attainment and technical proficiency do not make a complete physician. We too often see the dismal failure that comes when these are felt to be the only requisites for practice. The truly great physician is, as I think Dr. Rudolf has said, "he who, consciously or unconsciously, holds within himself and utilizes that gift of healing, that mystic personality that inspires faith in a sick man, who as he lies a crumpled wreck maybe, longs for the kindling spark of happiness, a ray of hope to light his darkness." A cheerful heart doeth good like medicine, applies to doctor as well as patient.

As servants and medical advisors of the public, it seems then our duty to study carefully all the facts of both individual and disease, and to base our opinion on these facts unbiased by the habit training of a specialty or the conservatism of tradition. Not only must every psychiatrist be a real physician, but in very truth, he who would be a physician must be something of a psychiatrist. We may indeed believe that the towers of El Dorado, though distant, gleam brightly for those who with inexhaustible hope and inflexible resolution, base their faith on the art as well as the science of medicine.

And when we say art, we remember that all art (including that of medicine) is long and life is short and ultimate complete success seems very far off. And thus, doubtful of our strength to travel so far, we talk a little about the aim of all art, which like life itself is inspiring, difficult and often obscured by mists. It is not in the clear logic of a triumphant conclusion, it is not alone in the unveiling of one of those heartless secrets which are called the laws of nature. It is not less great—but only more difficult.

Use of Drugs in Neurology and Psychiatry—Of the various symptoms which demand attention from the neurologist and the psychiatrist, C. MacFie Campbell, Boston (*Jour. A.M.A.*, October 15, 1921) says the most common are pain and distress, sleeplessness, agitation and excitement. These are the symptoms for which the physician has recourse to drugs, while the complex, underlying disorders are recognized to be beyond the reach of such simple methods of treatment. As for the treatment of pain and distress and sleeplessness, the danger of a purely symptomatic treatment is well known. They are merely indicators of the underlying disturbance, and it is the business of the physician not to confine himself to the warning sign, but to penetrate to the underlying disorder. Merely to remove the disconcerting symptoms involves the double danger of neglecting the fundamental trouble, and of developing an ignoble dependence on the drug. But symptoms deserve some attention on their own account, and pain is the one which is the most insistent. For conditions of mental distress with agitation, barbital in comparatively small doses is a very useful drug. Paraldehyde is the drug which gives the nearest approach to a normal sleep, but owing to its disagreeable odor the coal-tar derivatives have been much preferred, and of the series barbital is the most uniformly satisfactory. If in psychiatry the use of drugs is somewhat limited, it is largely because in these complex disorders the chief weight in the treatment must be laid on the personal relationship between physician and patient, on the organization of the nursing personnel, and on the atmosphere of the hospital with its occupational and recreational elements. It is in virtue of the presence of these factors that treatment in hospitals is, as a rule, to be recommended in preference to treatment of the patient at home.

THE CHLORINATION OF SMALL WATER SUPPLIES*

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PURIFICATION of water becomes necessary when the only available supply is polluted and in a dangerous condition. In selecting the method for any special case, it always depends upon the character and the amount of offending substances to be removed; upon the degree of purification required; upon the length of time the purification is to be carried on; upon the size of the available supply; upon the direct purpose for the purification and the ultimate end to be attained; upon the natural chemical contents of the water; and lastly, which is very often the most important, the available financial resources at our disposal for such a purpose.

The chemical disinfection of a water by chlorination, it must be admitted, is more or less only a temporary means at our disposal to overcome the dangers to health arising from a drinking water supply which has become polluted by sewage, thereby carrying the germs of disease. I have no intentions of advocating this method in preference to the slow sand bed filtration method that has most efficiently proved its worth. But when it has to be considered from the above-mentioned standpoints, and especially from the financial one, then disinfection by chlorination becomes of very great assistance in combatting the spread of most water-borne diseases (especially typhoid fever), as was illustrated a few years past in the epidemic of this disease which occurred in Montreal.

It is not my intention to enter into a discussion of the disinfection of large water supplies such as those in large cities, but only that of small water supplies as one finds in connection with institutions, factories, farms, and even that furnished to houses. In disinfecting small water supplies, as just mentioned, it is always found to be more difficult to regulate the flow of the required amount of chloride of lime solution than it would be when millions of gallons of water are treated every twenty-four hours, as takes place in large municipal supplies. There is also considerable difficulty in preparing small quantities of the chloride solution. The cost of installing a plant for treating a large municipal water supply and the employment of the necessary skilled labor to attend to it is often less comparatively than when we are called upon to plan and install disinfecting plants for small water supplies; very often with a smaller purse or smaller financial allowance to use; then it becomes a more difficult question to solve. For example, I may cite one out of several cases where this difficulty has arisen, namely, the case of the Protestant Hospital for the Insane, Verdun, Quebec. In trying to protect the patients and the staff in this hospital, the management requested me to examine the water supplied for use in that institution. This was done in December, 1917. The samples of water, taken from the supply to the pumps, contained colon and paratyphoid organisms. As the government allowance towards the upkeep of the hospital is found insufficient, it was impossible to install a filtration plant; yet the water had to be rendered non-dangerous to health, without conferring on the water any odor or taste which might induce some of the patients to refuse to drink it.

This institute, through an agreement with the City of Montreal, draws its water supply from the nine-foot concrete conduit which brings the water for the use of the citizens from the Lachine Rapids of the St. Lawrence river. This conduit passes just back of the hospital grounds and the institute receives its supply by an eight-inch pipe by gravity to the basement of the pumping station. The water being used at this time was the untreated St. Lawrence river water, which is none too safe at any time.

After the board of management received the report on the bacteriological condition of the water, they immediately decided to install a plant for the chemical disinfection of their water supply, as their financial resources would not permit them to erect a filtration plant as recommended. The one which has been installed has been in constant use ever since. It consists of two small concrete tanks measuring inside 3 x 3 x 3 feet, or of a capacity of 27 cubic feet. The mixing tank is placed on a level with the top of the chloride solution tank and is connected with it by a two-inch galvanized iron pipe placed six inches above the bottom of the chloride solution tank so that the sludge will not be disturbed by the solution flowing out from the bottom. A sludge pipe leads away outside to carry away the sludge after discharging the solution; this pipe is a three-inch one and is provided with a valve.

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In order to lessen the cost of this plant and facilitate the more easily the regulation of the flow of the chloride solution I invented a special drip nozzle or valve which does away with the discharge box usually employed in such plants. This nozzle allows the amount of solution to be accurately regulated.

From this valve the flow of the chloride solution is received into a funnel-shaped receiver. Also a stream of water is constantly discharged into this same funnel in order to keep up the water seal, thereby keeping out the air and preventing the pump from becoming air bound.

The capacity of this plant is sufficient to chlorinate the water supplied to this institution for four or five days. At the same time, there has never been any complaints of either odor or taste being detected from the water, as the amount of disinfectant added does not go above 0.75 parts of available chlorine per million parts of water.

Since this plant was installed the results have been most excellent, as no cases of typhoid fever have developed amongst the inmates.

From time to time the water has been examined by me bacteriologically, to ascertain if the results are the best; and I shall cite some of the bacterial findings made on several occasions.

In October, 1917, the water contained thirty-four organisms per cubic centimeter of water and the colon-typhoid group of organisms was found to be present.

Again, in December of the same year, another examination of the water was made and which yielded 138 colonies per cubic centimeter of water and the colon-typhoid group was still present.

After chlorination of the water was commenced, a very marked improvement was noticed to take place in it, as shown by the examination made in January, 1921. At this time, samples were taken direct from the supply pipe to the pump, before the dose of chloride solution was introduced into it, and gave on examination 17 colonies of bacteria per cubic centimeter of water with the colon-typhoid group present. But very shortly after the water received the treatment it showed only two organisms per cubic centimeter of water; while the colon-typhoid group was entirely absent. The more impressive do these results become when one considers that the time of exposure is very short.

From the above facts, we may conclude that this method of treating infected water is safe and at the same time renders an originally infected water harmless if cared for by a conscientious person.

When we consider the original source of this water supply, it is evident that liability of pollution is present at all times, as the St. Lawrence river receives the sewage from the various towns and cities which it passes on its way down from the lakes.

A very efficient emergency system using chloride of lime as the disinfectant may be installed where immediate action may be required in an institution or on a farm, with very little financial outlay. This consists of a mixing and of a solution tank, by making use of two stout vinegar barrels with their interiors painted with some good mineral paint or with asphaltum paint to prevent the too rapid action of the chloride on the wood. After such treatment the barrels will last for at least two years and possibly more. The piping should be of galvanized iron. If a valve as already mentioned be used the dosing can be easily regulated and the quantity of the disinfectant solution added according to the quantity of water to be disinfected. It is always very advisable to have a definite quantity of water in the mixing tank, say 40 gallons for instance, and to this add 2.5lbs of chloride of lime. This solution should yield 0.1 parts of available chlorine per million parts of water.

Lastly, the disinfection of wells by chloride of lime should be attempted when the water in the well is shown to have received polluting material. It is not a wise proceeding to fill a condemned well in and dig a new one in the same vicinity, as the polluted water is forced out into the surrounding ground water, which may thus become polluted. This would likely be drawn upon in the supply to the new well. If the well is known to be polluted, it should be disinfected by the generous use of chloride of lime and after 24 hours the water should be completely pumped out. The source of the pollution should be sought and the passage way which was followed by it traced, if possible, and removed or disinfected, after this the well should be treated as already mentioned.

The best method of carrying this out is by pouring into it a solution of the chloride. This solution of chloride should be added to the well in the proportion of five parts of available chlorine per million parts of water or one pound of the chloride of lime to every 332.6 cubic feet of water, or 25,000 gallons.

On several occasions, chlorine gas in liquid form has been used in my experience, but owing to the more destructive action of the gas on the various metal connections and fittings, it has been invariably found necessary to discontinue its employment. While it may be more satisfactory from the fact that it is more easily handled and that we do not have the sludge difficulty to contend with, disinfection by the chloride of lime method and by the rapid sand filtration method at present have the preference.

THE TREATMENT OF ACUTE PELVIC INFLAMMATION IN THE FEMALE*

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THE term "acute pelvic inflammation" is used to describe a group of cases that cannot be properly designated by any more definite name; a group in which all, or most of the pelvic structures are more or less affected. Thus it might not be correct to speak of acute gonorrhœal endo-cervicitis as acute pelvic inflammation, whereas an acute gonorrhœal salpingitis might quite accurately be so described, since the uterus, ovaries, peritoneum and cellular tissues with their lymphatics and blood vessels might all to a greater or less extent be involved.

From the standpoint of treatment, the most important preliminary consideration is a classification based on the various ætiological factors which may give rise to pelvic inflammation. Thus we may have:

1. Infection following full term labour, accidental miscarriage or abortion.
2. Infection associated with some traumatism to the pelvic tissues, such as surgical procedures, or attempts to produce abortion.
3. Infection secondary to new growths, such as sloughing fibroid, or carcinoma.
4. Infection by specific micro-organisms, such as the gonococcus.
5. Infection from an extra-pelvic cause, such as appendicitis, or diverticulitis.

It is worthy of note that all the above ætiological factors, except the relatively few in group 3, are or should be entirely preventible, and it is consequently axiomatic that the best treatment of pelvic inflammation is prophylactic.

It may further be laid down as a basic principle that the treatment of every form of *acute* pelvic inflammation is essentially medical, and entirely expectant, and that the aim should be to so assist and strengthen the defensive forces of the body that they may overcome the infection, localize the inflammation, and eventually cause the absorption of the products of tissue reaction.

Rest in bed, frequent hot vaginal douches, ice to the lower abdomen, proper attention to nutrition and to elimination, with a judicious use of antitoxins and vaccines, are general measures which by themselves will permit of the cure of the majority of these cases.

Pathologically, pelvic inflammation may affect chiefly the uterus, the pelvic cellular tissues, the pelvic peritoneum, or the appendages, but since in every case each of these tissues is involved to a greater or less extent it is more convenient to discuss treatment according to the ætiological factors concerned.

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*Read at the annual meeting of the Ontario Medical Association, Niagara Falls, June 3, 1921

(1) *Infection following full-term labour, or accidental miscarriage or abortion.*

This group may be infective or septicæmic from the beginning, especially when following instrumental delivery with extensive laceration of the cervical zone, but probably the majority of these cases are sapræmic in origin, the symptoms depending on absorption of toxins from decomposing placental debris or blood clot.

Referring to each, it is important to note that the symptoms have followed the expulsion of all or of most of the uterine contents, and that as a consequence the cervix is dilated or easily dilatable. Under these circumstances, when threatening symptoms arise, the first essential is to determine that the uterine cavity is free from placental remains, decomposing blood clot, or retained pus, as may be seen for instance in acute retroflexions.

It is important to remember that sapræmia or absorption fever is rarely a distinct entity, but rather a condition of balance between the invading micro-organisms and their toxins on the one hand, and the protective forces of the body including the leucocytic zone on the other. Slight injury to the latter, without complete removal of the former, may easily permit a mild sapræmia to develop into a severe septicæmia.

The operation of clearing out the uterus is therefore not one to be lightly or carelessly undertaken. It requires considerable attention as to detail, and unless it can be done thoroughly is much better not done at all.

The patient should be prepared as for an aseptic operation, the vagina repeatedly flushed until absolutely clean, and a culture made from the cervical discharge. If the cervix is patulous the ungloved finger is the best instrument for determining the condition of the uterine cavity, for recognizing small pieces of adherent placenta, and for removing the same.

In certain cases where the placental remains are more adherent than usual, small polypus forceps introduced with the finger as a guide will be useful, or occasionally a loop curette may be of assistance. In no case should a sharp curette be used, and the term "curettage" should not be applied to this operation. In the class of case now under discussion, if the cervix is not dilated sufficiently to admit the finger, it is quite permissible to gently dilate it to the required extent. When the examiner is satisfied that the uterine wall is everywhere smooth and free from adherent debris, the uterus should be thoroughly irrigated with a mild antiseptic, the cervix being meanwhile maintained widely open. The uterine cavity and cervix should then be lightly packed with iodoform gauze, both for its slight antiseptic action, but more especially for its effect in stimulating uterine contraction and thus shutting off lymphatic absorption. For the same purpose a preliminary dose of pituitrin should be given, after which ergot and quinine should be administered. The packing should be removed after twelve hours and a hot vaginal douche given. It is also our custom to give a preliminary dose of "stock mixed infection vaccine" at the time of the operation. This may later be repeated or modified, depending on the course of the infection, and upon the laboratory report of the cervical culture.

If now the symptoms rapidly subside, the case may be set down as having been one largely of sapræmia, and an attitude of watchful waiting will be all that is necessary.

If on the other hand the condition is progressive, it is evident that it is one of septicæmic infection, and further interference with the uterine cavity is useless. From this time on the treatment is similar to that of primary septic infection, and will be discussed later.

2. *Infection associated with traumatism to the pelvic tissues.*

This group readily falls into two divisions, viz:

(a) following surgical operations,

(b) following attempts to produce abortion.

The first division requires little comment at present, since the operator knows exactly what was done, and hence is in a position to treat symptoms as they arise. Relief of tension by removal of sutures, hot irrigations and other general measures will of course be indicated until the further course of the condition becomes plain.

With regard to the prophylaxis of infection following surgical operations on the pelvic organs, stress should be laid on the inadvisability of doing reparative work until a considerable time has elapsed after parturition or miscarriage. We have learned much of recent years as to the ability of bacteria to lay for months dormant in the tissues, only to be stirred into vigorous activity by the traumatism of an operation, and the most severe infections with which I have had to cope have been in cases where operation was undertaken at too early a period after childbirth.

The second division often presents a considerable number of difficulties. In the first place, it is usually impossible to secure an accurate history of what was done. Secondly, the infection often precedes the uterine evacuation, and consequently the cervix is usually hard and unyielding. Thirdly, the infection may have been introduced into the pelvic cellular tissues, or even into the pelvic peritoneum directly by punctured wounds from gum elastic catheters, hair pins, or other implements, and consequently the uterine cavity and its contents may not be infected in the slightest degree. Under these later circumstances, to dilate a rigid and infected cervical canal, to introduce instruments for the purpose of clearing out the uterus—since dilatation to admit the finger can rarely be secured, and thus add additional traumatism and infection to that already present—would appear to be very bad treatment. Of course it is evident that all gradations between such a hypothetical case and one in which the catheter has entered the uterus without parametric damage, causing sufficient disturbance to the contents to bring about uterine contraction, and hence some degree of cervical dilatation, will occur, and consequently each case must be treated on its merits. Arguments as to the relative advantages of active and conservative measures in cases of septic abortion have been very prolonged, but at the present time the concensus of opinion appears to very definitely favour a policy of non-interference, unless there are definite indications to the contrary, of which perhaps the only really important one is severe hæmorrhage. The correctness of this attitude is well substantiated by the results of the intensive study which has been made by Hillis (1) of the cases of septic abortion admitted to the Cook County Hospital in Chicago.

3. *Infection secondary to new growths, such as sloughing fibroid, or carcinoma.*

This group is rarely responsible for *acute* inflammation, although suggestive symptoms may occur due to sapræmic absorption from a sloughing intrauterine fibroid. The treatment is that of the causative condition.

Under appropriate treatment, the acute pelvic inflammation following any of the above conditions may rapidly subside. If however the symptoms persist, or tend to become aggravated, indicating that the inflammatory process is extending, it will usually be found that this extension is taking place in either of two directions, depending on whether the infective process is located chiefly in the pelvic cellular tissue, or chiefly in the pelvic peritoneum. In either case the treatment should be along the general lines already laid down, until some definite indication for operative interference presents itself. The extent of the inflammatory mass which may form in pelvic cellulitis, and the degree of fixation of the uterus and other pelvic structures which may occur, is surprising, but not nearly so surprising as the absolute absorption of the same which may occur under expectant treatment. A careful watch should be maintained for bulging and softening in either of the fornices or in the pouch of Douglas, and if abscess formation is suspected its presence may definitely be shown by the careful use of a small aspirating needle. If present it should be opened through a vaginal incision behind or to the side of the cervix as may be indicated. After the vaginal wall is incised approach to the abscess may safely be made by a slender pair of forceps introduced closed, and withdrawn open, or if preferred the finger may be introduced through the vaginal opening and used as a guide for a pair of sharp pointed scissors, which are advanced closed, keeping close to the cervix, then opened to dilate a tract which the finger may follow. If the abscess is in the broad ligament the peritoneum should not be opened, while if it is in the pouch of Douglas care should be taken not to open or disturb the overlying layer of protective adhesions, and in either case the cavity should be drained by a self-retaining rubber tube. It should not be irrigated, and the tube should be retained in place, or possibly changed for a tube of smaller size, until the cavity is almost obliterated.

Certain cases of broad ligament suppuration will not present in the vaginal fornix, but will become evident as a tender swelling in the groin. These are best reached by an extra-peritoneal dissection over the inner half of Poupart's ligament.

Finally: what is to be done for those cases of frank pelvic peritonitis resulting from any of the above ætiological factors, where there is no attempt on the part of nature to localize the inflammation, but where on the contrary the peritonitis is definitely spreading? The fact that most of these cases are suffering from a generalized septicæmia or pyæmia, of which the peritonitis is only a part is sufficient reason for expecting a high death rate whatever the treatment. One feels however, where the peritonitis is the most striking feature as evidenced by local pain, rigidity, vomiting and distension, that occasionally we can save a patient by supra-pubic pelvic drainage. Fowler's position and the Murphy drip. In the acute cases now under discussion I have not seen any greater benefits accrue from more extensive operations, such as hysterectomy, than from drainage alone, and the immediate mortality is certainly higher.

Cases of spreading thrombosis usually arising in connection with pelvic cellulitis are rather part of a subacute condition than acute. Attempts have been made to ligate the vein especially the ovarian—above the thrombosed area, and to remove the affected part, One is not overly enthusiastic about the results thus secured.

A discussion of the treatment of generalized septicæmia and pyæmia is not part of this symposium, and it may suffice to say that the antitoxins have disappointed us, the vaccines are too slow, and that possibly the future may demonstrate the value of the intravenous injection of antiseptics such as eusol, or of the transfusion of blood from immunized persons.

4. *Infection by specific micro-organisms.*

Under this head we may at once dismiss syphilis and tuberculosis as not being the cause of acute pelvic inflammation. On the other hand gonococcus invasion of the Fallopian tubes and contiguous structures is probably one of the commonest causes of this condition. The inflammation may be largely confined to the Fallopian tube by sealing of the fimbriated end producing pyosalpinx, may involve the ovary by contiguity, may cause tubo-ovarian abscess, or may extend to the pelvic peritoneum, causing extensive peritoneal reaction. In certain cases the infection passes through the tube rapidly and precipitates a spreading peritonitis, without any definite pus collection occurring in either the tube or ovary. In any case the peritonitis is remarkable for its adhesive character, a large amount of fluid exudate being rare, and when the abdomen is opened the usual appearance is of distended loops of bowel, intensely congested, and glued together by a croupous exudate. I am of the opinion that surgical intervention is distinctly contra-indicated in every case of acute pelvic inflammation, whether tubal, tubo-ovarian or peritonitic, in which the gonococcus is the ætiological factor. If peritonitis is not present it certainly will result from attempts to remove an affected tube or ovary during the acute stage, and if it is present and spreading, it will not be benefitted by an attack on the appendages, or by any form of drainage. It is of course evident that these remarks apply definitely to the acute stage only. When this has subsided the gonococcus rapidly becomes inert either through death of the organism, or through the development of protective mechanisms on the part of the body, and then it is equally true that surgical interference may be imperatively indicated, and it is surprising with what safety and with what absence of reaction a pelvic mass consisting of tubes, ovaries, and uterus may be extirpated, or a bilateral salpingo-oophorectomy performed. In the acute stage the only question is one of diagnosis. It must be remembered that one who has gonorrhœa may become pregnant, or think that she is, and attempt to produce an abortion. In this case the ætiology of the pelvic inflammation may be obscure, but the case should be treated conservatively until the diagnosis can be made. The only condition in which operation should be considered is that where there is a reasonable possibility that appendicitis is the cause of the pelvic inflammation, because of course the presence of gonococci in the urethra or cervix does not eliminate the possibility of appendicitis.

5. *Infection from an extra pelvic cause, such as appendicitis, or diverticulitis.*

Since diagnosis is not the subject of this contribution, I will merely point out that no common problem requires more judgment in its elucidation in a certain proportion of cases than the differentiation between acute appendicitis and acute oophoro-salpingitis, and in perhaps no other class is the successful outcome more dependent on the accuracy of the diagnosis, and on the carrying out of he indicated treatment, operative on the one hand, and conservative on the other.

The same remarks apply with somewhat less force to diverticulitis of the sigmoid, but the symptoms in this condition are rarely as acute, and an accurate history and careful roentgenological examination will usually permit of the proper diagnosis and of the indicated treatment being carried out.

REFERENCE—

HILLIS—"*The Treatment of Abortion:*" Surgery, Gynæcology and Obstetrice, Vol XXXI December, 1910, p 605

THE X-RAY DIAGNOSIS OF GASTRIC AND DUODENAL ULCER*

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IN the brief time allotted for the presentation of this important phase of the diagnosis of Gastric and Duodenal Ulcer it will be possible only to outline the method employed, to indicate its value as a diagnostic agent and to show a few lantern slides which will illustrate the pathology I shall describe.

In the first place it should be noted that, contrary to the title of this part of the symposium, there is no such thing as "*x*-ray diagnosis" of this or of any other pathological condition. The term is a misnomer. This is a method of examination based on the use of an instrument of precision, the *x*-ray tube, in conjunction with a sensitive photographic plate, or a fluorescent screen. The interpretation of *x*-ray findings on plate or screen in terms of pathology requires more skill, judgment and experience on the part of the physician than probably any other diagnostic procedure, not even excepting for instance the use of the microscope or the stethoscope. It should not be inferred from this that the *x*-ray method does not make errors. These mistakes however are nearly always of technique, or at least of interpretation, and are the result of lack of experience. It is often the case that when the surgical findings have been different from the *x*-ray findings a subsequent careful review of the plates will show the unrecognized pathology corresponding to the lesion which the surgeon has demonstrated. I should like therefore to urge the careful and prolonged examination of the plates, due deference being paid to the experience of the roentgenologist in gastro-intestinal interpretation.

Statistics as to the value of the *x*-ray examination of the stomach might be quoted at length: Carman in 1916 at the Mayo Clinic found in a large series of cases followed to operation, or autopsy, definite *x*-ray findings in

93% of gastric carcinomata,
83% of gastric ulcers,
60% of duodenal ulcers.

To quote further from Carman:

"From our own statistics we can say that nine-tenths of the ulcers of the stomach gave distinct roentgenologic indications of gastric disease, and in an overwhelming majority of these the roentgen signs were pathognomonic or strongly presumptive of ulcer."

Lewis Gregory Cole of New York in a further large series of gastric cases reports that operative findings on the stomach checked up with *x*-ray findings gave 96.6 per cent. correct as to pathology. Under these conditions the routine *x*-ray examination of the digestive tract in all patients with gastric symptoms, is therefore not only justifiable but necessary.

TECHNIQUE

The fundamental principle of the *x*-ray method as applied to the gastro-intestinal tract is the detection of alterations, permanent or transitory, in the normal contour of the digestive tube. These alterations of contour take the form of additions to, or subtractions from the normal shadow of the gastric or intestinal lumen as seen on the plate or fluoroscopic screen. The patient, properly prepared, with the gastro-intestinal tract empty, and divested of all unnecessary clothing, is first placed in front of the vertical fluoroscope behind the sensitive screen and in a darkened room. He is then given from two to six ounces of chemically pure barium sulphate thoroughly stirred either in water or in any other suitable suspension medium. The passage of this opaque material through the œsophagus is carefully watched, special attention being paid to any apparent narrowing or irregularity of its lumen. The stomach as it fills is similarly studied.

By means then of inspection of the illuminated screen and by palpation with the gloved hand,

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*Read at the forty-first annual meeting of the Ontario Medical Association, Niagara Falls, Ont., June, 1921.

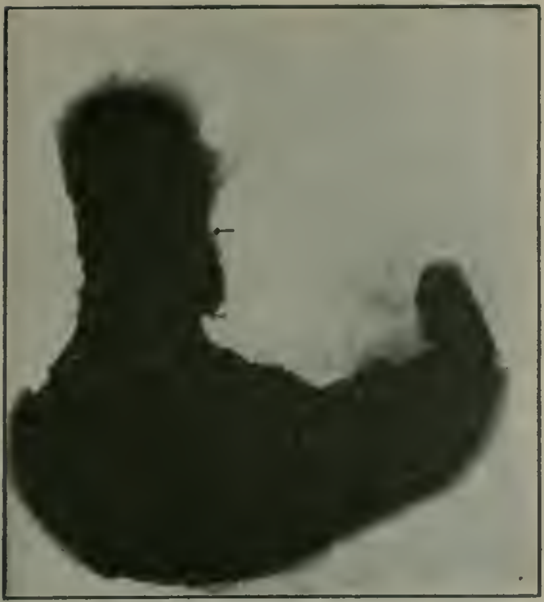

FIG. 1.—Large gastric ulcer.

the barium-filled stomach is thoroughly examined. Peristalsis is studied, and exact information is obtained as to the flexibility of the gastric walls, irregularities or abnormalities of outline, the presence of palpable tumour masses, of painful points on pressure, the effects of varying positions of the patient and of palpation, and finally the passage of the opaque gastric contents through the pylorus. The condition of the pylorus as to patency or obstruction is then determined and finally a careful study of the filling and exact outline of the distended duodenum is made, this being assisted by massage of the stomach contents through the pylorus.

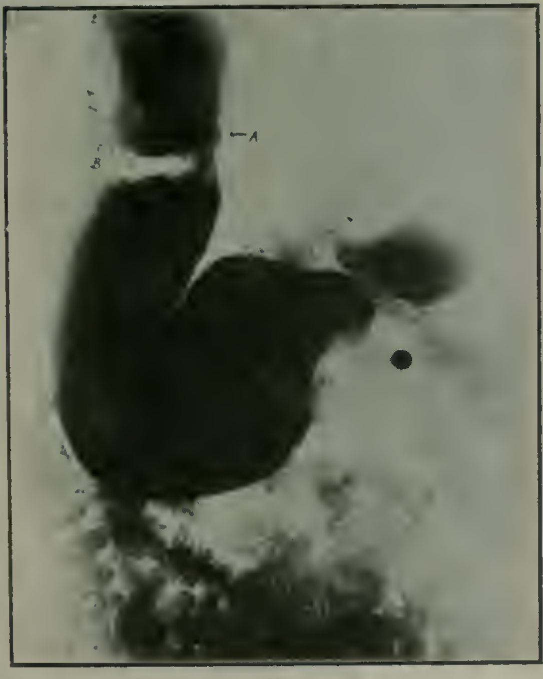

FIG. 2.—Small penetrating gastric ulcer at A. Deep incisura at B.

Immediately following the fluoroscopic examination a number of serial plates varying from two to ten or more are made, some in the prone posture and others in the erect. Guided also by the information gained during the preliminary screen examination plates may be made in the oblique or lateral positions. The patient is examined again in about five hours to determine the emptying time of the stomach, the possible presence of pyloric obstruction and the position of the head of the advancing column of barium in the gastro-intestinal tract. A further examination is made in twenty-four hours, at which time the opportunity is taken of again examining the stomach and further plates are made if desired.

This briefly describes the writer's usual routine in gastro-intestinal *x*-ray examinations, but it is often considerably varied to suit the indications or requirements of the particular case being studied.

GASTRIC ULCER

Let us now turn to a consideration of the pathology of gastric ulcer. The lesion is a more or less circular area, varying in size from a split pea to two inches in diameter, situated usually near the pylorus, and nearly always involving the lesser curvature or the posterior wall. It is characterized by a loss of tissue involving first the mucosa only and later the deeper layers. The inflammatory reaction results in the production of scar tissue and induration with ultimate deformity of the gastric wall. The demonstration of this deformity is the fundamental principle on which the diagnosis of ulcer depends.

Minute inspection of the stomach profile on plate or screen will show the slightest break in its regular contour. A small bud-like projection from the main barium shadow, constantly seen, and usually on the lesser curvature, represents the actual ulcer crater. This niche is pathognomonic of penetrating gastric ulcer. If actual perforation of the stomach wall has occurred the *x*-ray picture is characteristic. The accessory pocket is demonstrated as a sac or pouch, varying in size from a quarter of an inch to an inch or more, outside the stomach proper. This pouch may retain its contents after the stomach is empty and its shadow is usually connected with that of the stomach by a narrow neck or isthmus.

In addition to the direct demonstration of the

the stomach wall, there are other more or less indirect signs.

The incisura is a fixed and usually deep indentation of the greater curvature opposite an ulcer. Its production is believed to be due to the irritation of the ulcer causing a spasm of the circular muscle fibres in that plane. A true incisura must be distinguished from other transient depressions such as that due to the edge of the costal arch and from peristalsis. Peristalsis is easily distinguished by appearing as a moving wave. Those due to reflex spasm usually disappear following massage or the administration of atropine to physiological effect, and this test should always be applied when irregularities appear which cannot be definitely diagnosed as being due to organic causes.

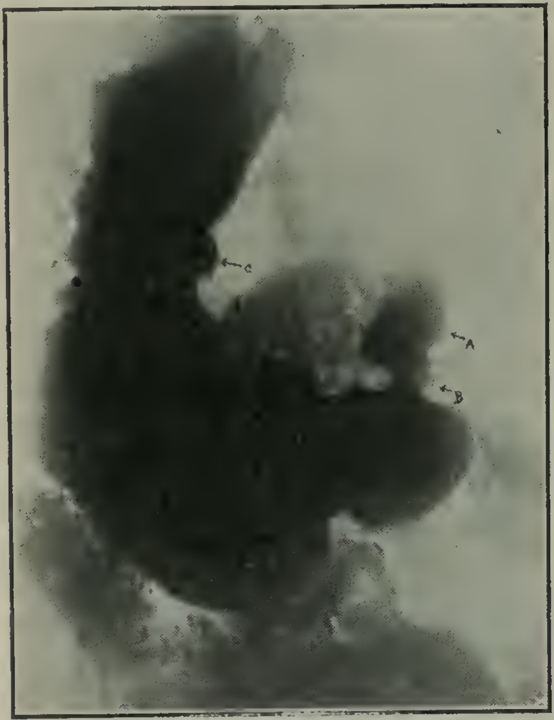

Fig. 3.—Perforating gastric ulcer at A.
Duodenal ulcer at A—B.

The organic hour-glass stomach may appear in the absence of an accessory pocket and must be distinguished from the spasmodic hour-glass condition which can usually be relaxed by the administration of belladonna.

A pressure tender spot definitely localized on the lesser curvature, especially if occurring opposite an incisura, is of considerable value. If a tender point occurs with an incisura it is fair proof of an ulcer even if Haudek's niche is not visible.

Lessened mobility from induration of the gastric wall, at the site of an ulcer, is an area of rigidity over which there is no evidence of peristaltic waves. There is often seen an irregular filling defect over such an area. As stated a moment ago, if a definite niche, which was described so characteristically by Haudek, is seen on the lesser curvature and if opposite this on the greater curvature we see a deep, narrow, fixed indentation, actual ulcer, from its invasion and deformity of

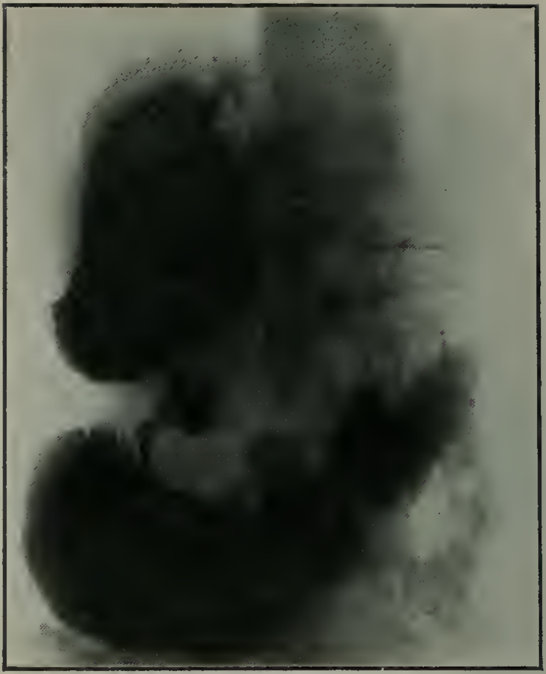

Fig. 4.—Gastric ulcer with Accessory Pocket and organic hour-glass constriction. At operation this was proven non-malignant

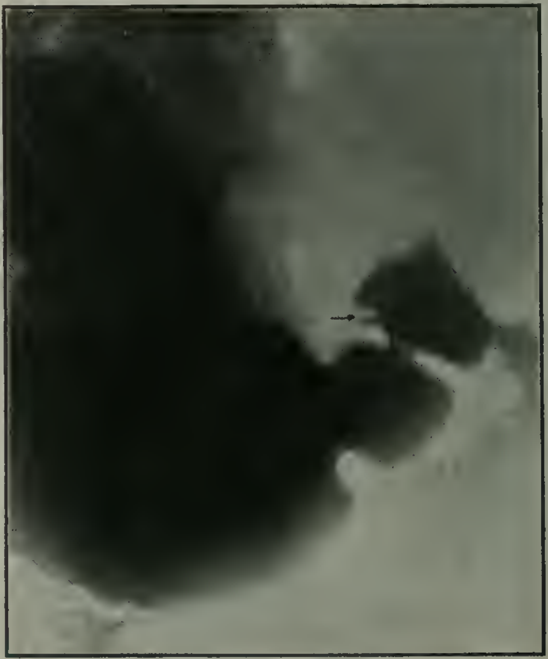

Fig. 5.—Very small duodenal ulcer.

the diagnosis of ulcer is certain. The other signs described taken singly may be of slight value; taken together and their value weighed carefully by an experienced observer, especially when associated with the clinical data, the diagnosis can usually be made positively. Degeneration of an ulcer and the presence of malignancy should be suspected in all cases where the ulcer crater is large but, as is well known, the final diagnosis of malignancy rests with the pathologist.

Duodenal Ulcer

Pathologically there is no difference between duodenal and gastric ulcers, except that the latter are larger, are more prone to the production of scar tissue, are more likely to produce adhesions and in many cases degenerate into carcinomata.

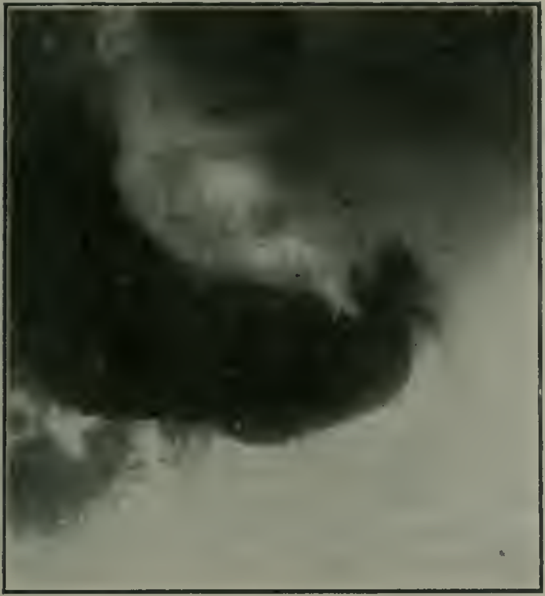

Fig. 6.—Duodenal ulcer.

For some time after the study of ulcer was begun an effort was made to establish the diagnosis, by means of the *x*-ray, on certain indirect signs such as gastric hypermotility and rapid emptying, or delay of the barium in the duodenum. Some of these indirect signs to which different writers have drawn attention, and on which attempts to base a diagnosis of duodenal ulcer have been made, might be mentioned and explained.

1. The accessory pocket of perforating ulcer corresponds to the same sign in gastric ulcer but is rarely seen in the duodenum.

2. Gastric hyperperistalsis and hypermotility with rapid emptying due to the irritation of an ulcer.

3. Pressure tender point over the ulcer as localized on the screen.

4. A residue after six hours due to partial obstruction of the pylorus from contraction of the scar of a duodenal ulcer.

The value of these indirect signs, however, is not to be compared with that of visualizing on the screen or on serial plates a fixed and constant irregularity of the duodenal bulb corresponding to the location of an ulcer. The first portion of the duodenum, in which ninety-five per cent. of all ulcers occur, is a constant entity, and the appearance on the plate or screen of a perfectly normal bulb or "cap," at it is often called, rules out the presence of ulcer. The shape of the duodenum as seen by *x*-ray is characteristic and any ulcer which is more than a simple erosion of the mucous membrane will cause a deformity of this smooth outline. A deformity of the duodenum may be produced by adhesions or by spasm from reflex causes, such as cholecystitis or appendicitis, but these filling defects are not constant in outline and in the cases due to spasm may be eliminated by the administration of belladonna. I believe that with sufficient care and persistence the outline of any duodenal ulcer of surgical size can be demonstrated on the screen or on serial plates; and it has been my good fortune in several cases to have been able to demonstrate lesions of this character in the duodenum which at operation could scarcely be felt by the examining finger of the surgeon.

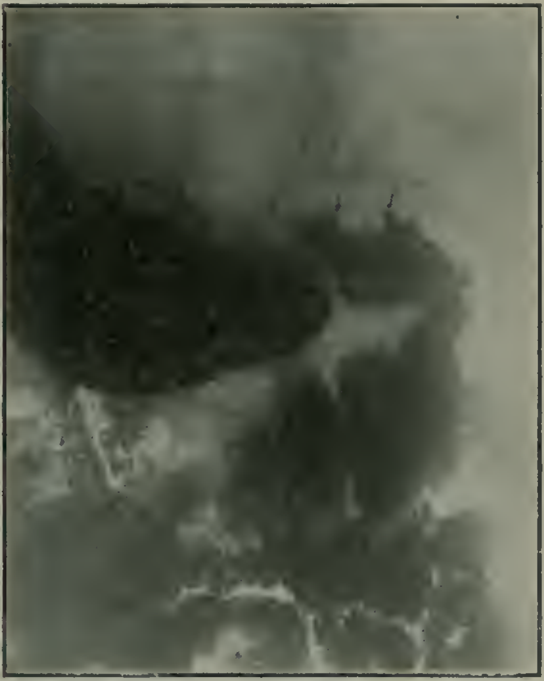

Fig. 7.—Large duodenal ulcer showing crater.

PROGNOSIS AND DIAGNOSIS IN TUBERCULOSIS AS AIDED BY SEROLOGY*

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NEXT in importance to the diagnosis in pulmonary tuberculosis follows prognosis as a close second. Once the case is definitely diagnosed tuberculous, we ask what to do and for how long? If the infiltration is recent and active, we take strict measures by sanatorium regime to bring the disease to a quiescent state as surely and with as little delay as possible. If not so recent or active, and if constitutional symptoms are not marked, we say, perhaps, that the patient has already acquired some immunity and possibly the strictest measures may not be advisable.

If for instance he has already had six months or a year at sanatorium, he should have learned, and learned well, how to live. If his disease has reached the stage say of quiescence or apparent arrest, and if home conditions permit him to live in a fairly hygienic manner, perhaps he may safely remain at home. Possibly also he can work.

Or again, even on first diagnosis, the disease although definite may be of very slight extent with constitutional symptoms exceptionally mild. Is it ever permissible here to allow the patient to remain at home under certain restrictions and careful supervision? Have we any means of foretelling his clinical progress by gauging his present biological resistance to tubercle? Have we anything to add to the series of clinical observations we have used for some years, namely, response of temperature, pulse and focal activity to rest, etc.? We believe we have additional assistance in prognosis in the results of the examination of the blood for the inhibitive reaction. These results can be better interpreted, and are of greater value, as repeated tests are made, and when taken into consideration with repeated clinical observations, the tuberculo-complement fixation and the skin reaction.

In 1911, while at Muskoka Sanatorium, I wrote on "Difficulties in Prognosis" (1) detailing the usual series of clinical observations mentioned above, and saying "that we could save valuable time to patients if we knew better how to prognose." I then observed that "Caulfeild (2) has given us frequent assistance in prognosis by his investigation and interpretation of the biological states in tuberculous patients" and I anticipated that "the resistance remains to be further studied by research biological work." I am now in a position to report upon the results of this serological work in one hundred cases, and to set them alongside the actual clinical conditions. Seventy.three of these cases were in private or consultation practice and twenty-seven of them in the D.P.H. Chest Clinic at the Western Hospital. The bloods were drawn by myself and the serological work done under Dr. Caulfeild's supervision at the Connaught Anti-toxin Laboratories, Research Division, University of Toronto.

The inhibitive reaction is a serological test used to estimate the amount or degree of inhibitin in the blood. Inhibitin is the name applied to certain bodies or qualities found in the blood of tuberculous patients, who, as I shall show later, are resisting their disease well, that is from a biological standpoint. "Owing to possible changes in the biological classification in the course of a case the prognostic value is necessarily limited to a period of time, and these tests must be repeated in following the case and to anticipate any clinical change." (1). It must also be accepted that these reactions have "reference to some tuberculous antibody only, and a patient can conceivably have a marked resistance to the tubercle bacillus and still be dying from some complication." (6).

The inhibitive reaction was noted by Caulfeild in 1911 while working in serology at the Gravenhurst Sanatoria. In an endeavour to obtain some explanation for the lack of correlation between the results obtained with the tuberculo-complement fixation and the clinical cases, he developed a protocol which seemed to be basically different from the detail and type of protocol as used for the true tuberculo-complement fixation test. This technique he eventually named the inhibitive reaction. In this test the greater the degree of hæmolysis the greater the degree of the inhibitive reaction, a reaction which is the direct opposite to that obtained with the tuberculo-complement fixation test. (The term inhibitive was adopted because certain non-specific factors were apparently inhibited by the action of the specific tuberculous serum in the particular antigen used in the test.) Those cases giving a marked degree of hæmolysis, that is a strong inhibitive reaction, so frequently showed favourable progress that this correlation was a very striking feature. (I recall the discussions very well as I was then on the clinical side of the same institutions.) In 1911 (2) he published a monograph on this and the tuberculo-complement fixation, and since then the latter test has been taken up and tried out by many laboratory workers in America while the former test has been left for the originator and his co-workers to develop.

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*Read before the Ontario Laennec Society at the Kingston Meeting, October 22, 1920.

In regard to the tuberculo-complement fixation, Watkins and Boynton (6) introduce their comprehensive and lucid paper with these words: "Much water has passed under the bridge since Caulfeild's article on this subject in 1911, but the stream has not increased in clarity as fast as it has grown in volume." Whereas on the one hand we feel this to be true of the fixation reaction, which has been done in all our cases together with the inhibitive, we find, on the other hand, that the stream of our inhibitive results has increased in clarity as it has grown in volume. Again where Pritchard and Roderick (7) say "the complement fixation reaction was used as an aid in diagnosis and not as a control in treatment" in their series, they very well state our attitude, yet in contrast, we use the inhibitive reaction for prognosis and as a control for treatment primarily, and as an aid in diagnosis secondarily.

The inhibitive reaction obtains in three degress, namely, marked, moderate and slight, or in easier phraseology, first, second and third class. These correspond to the laboratory abbreviations which Caulfeild has been using for ten years, viz., I^1, I^2, and I^3. There may also be an indifferent or negative inhibitive, which makes a fourth possible result, although the difference between slight and indifferent is comparatively insignificant in adults and we usually reckon them, for practical purposes, as the same.

In cases of definite clinical tuberculosis the reaction may be marked, moderate or slight. When the reaction is markedly inhibitive (first class) it is found that the patient is progressing very favourably against his disease; when moderately inhibitive (second class) he is progressing favourably, but to a less degree; when slight or indifferent (third class or negative) progress against tubercle is usually nil, and frequently the patient is failing.

Now to state what we believe takes place in an individual from the time he is a clinical normal, through a period when he is reacting to tubercle, to the time again when he may be free from the disease and say cured, the course is as follows: The reaction is primarily negative or third class, then second class inhibitive, later possibly first class, and here the reaction will remain as I^2 or I^1, until the infection fades out, and is no longer a factor. Then the reaction is again that of the normal, namely, third class or negative.

It so happens in clinical tuberculosis that the reaction most frequent is the third class inhibitive, suggesting, according to our interpretation, little or no progress against the disease; perhaps you will admit that this corresponds to our clinical observations. In a fair percentage of clinical cases, a second class inhibitive obtains, while rarely do we find a first class inhibitive. Perhaps this also fits in with what we find in clinical observation of a large number of cases, namely, that comparatively few of our positive cases progress steadily and favourably, and very few make rapid uninterrupted progress against a definite tuberculosis.

Of the twenty-seven cases in my clinic series, the blood was done for aid in prognosis in fourteen, and for possible aid in diagnosis in thirteen. Of the fourteen done for prognosis, the first results were as follows:

One case gave first class inhibitive in May, 1920, was moderately advanced, underwent three months' sanatorium treatment, symptoms abated and have been absent since.

Two cases gave second class inhibitive. R. C. gave second class and positive fixation September, 1920, had advanced and extensive lesion with positive sputum, previously fever 100 and 101, since September, and on latest knowledge, December, 1920, holding his own with normal temperature and feeling of well-being. Case D. C. gave second class and positive fixation August, 1920, had advanced and extensive lesion of three years' duration with cavity and much fibrosis, and in December, 1920, was going about, feeling well and carrying on light jobs.

Eleven cases gave third class inhibitive. The classification and progress of these may be noted as follows:

Incipient, two in number. A. B., clinically presumable tubercle, commencing with hæmoptysis of a pint. Third class inhibitive and positive fixation January 7, 1920; third class, weak positive fixation June 11, 1920, and so far she was stationary. Second class, fixation positive, August 8, 1920, and at this time feeling better than for years. It might be worth noting that O.T. had been given therapeutically for six months prior to this last date. (This case was later shown before the Laennec Society at their February meeting, 1921). January, 1921, third class, fixation positive, and had been in bed with pleurisy.

Case I. W. Clinically probable tubercle, gave third class and fixation negative November 6 1919, November 28, 1919, and April 14, 1920, stationary.

Moderately advanced, in number six. Two of these improved but gave second class within three months, three were stationary, one failed and died.

Advanced, three in number, all positive and advanced cases. One, D. McK., later gave second class and improved somewhat, the other two remained stationary.

Of the 73 cases in my private series, the blood test was done for aid in prognosis in 28 and for assistance in diagnosis in 45.

In my tabulation of the 28 cases in which the inhibitive test was done for aid in prognosis there were no first class inhibitive, while nine gave second class, six of these were found later in the column of those having made clinical progress, and three in the stationary column. Of these latter three, one was advanced and two far advanced. Three gave I^3 plus and were found to progress. Twelve gave only third class inhibitive and eleven of these remained stationary or failed. The other was a case of arrested tuberculosis, had been teaching school for a year and keeping well. Although the test was done here primarily for prognosis, the result caused me to reconsider the present diagnosis. With a third class inhibitive and only a weak positive fixation, and with no symptoms nor signs for many months, I was forced to presume that tubercle as a factor had faded out as had the reactions. Four gave negative inhibitive reactions, three of whom failed, and one remained apparently well. This last case also, although primarily tested with regard to prognosis and with the question of marriage in view, had because of the negative inhibitive and weak positive fixation to be reconsidered from the standpoint of present diagnosis. Had not her tuberculous disease faded out and was she not then apparently cured? Twelve months have now passed, the inhibitive remains the same, and our former patient has been married and doing her own housework for eleven months.

Individual examples of assistance in prognosis:

Case K. C.: Man of thirty, under clinical observation for four years, with incipient pulmonary tuberculosis from April, 1916. Tubercle bacilli present in sputum, weight then 186. Refused to enter sanatorium but promised to obey limitations if allowed to remain at home and work part time. Resting a few weeks at first, then working four, six, or eight hours daily as foreman in a factory, carried on with periodical examinations till December 16, 1919, when he reported feeling not so well and with slight fever, 99.9, 99.6. Sanatorium again advised and refused. Blood drawn, result third class inhibitive. Patient went to bed for a fortnight, got up and again tried to work, but could not stay at it. Chest, thick walled, but gave signs of extension of disease. X-rays showed definite extension. Blood again third class and weak positive fixation March, 1920; symptoms increased, chest pains, slight fever, throat sore and hoarse and he went to sanatorium. Patient still away and quite unable to resume work. April, 1921, still failing.

Case W. B.: Man of forty-three, incipient tuberculosis August, 1917. Tubercle bacilli present in sputum. Sent to sanatorium (Calydor), remained a number of months and returned to work, reporting for periodical examination. January, 1920, not so well ,and came for advice about going away. Blood was third class, fixation strong positive. Chest signs not so good. Advised several months' rest. On his return felt better, is again at work, and blood second class, fixation positive.

Case L. D.: Girl of twenty-two, moderately advanced, February, 1918. Left upper lobe lesion active. Tubercle bacilli not found in sputum. Stereoscopic plates showed definite snowstorm appearance in left upper. Patient went home to the country for a year and returned to work with no symptoms and no local signs of active disease. Remained under periodical observation and in February, 1920, after a mild grippe, physical signs showed slight reactivation. Sanatorium advised, but patient begged to be left at her work as designing milliner. The blood test was appealed to and gave second class, fixation positive. Encouraged by this she was permitted to remain at work in the city with restrictions, including the giving up of teaching at night school. She was also given a course of tuberculin. In May signs of activity in chest were much less. Blood again second class, fixation positive. August, 1920, blood still second class, but negative fixation. Patient has gained some weight and is feeling very well. Later observations: December, 1920, third class inhibitive, weak positive fixation. Patient at work and apparently well. April 13, 1921, reported not eating nor sleeping well. Blood still third class but positive fixation, fever following week 100 and 101, and definite physical signs of reactivation of upper third left, front and back. Stopped work and was sent to bed. May 5, blood second class inhibitive and negative fixation, no fever, and patient feeling much better, rales much less in extent. Went to Muskoka Hospital next week. I should have given my patient warning to report more frequently for re-check with the drop to third class inhibitive in December, 1920.

Case C. A.: Wife of physician, age fifty, always very energetic, had been under semi-annual observation for ten years with frequent and often severe bronchitis. Husband was told that tubercle had probably been a factor; signs of old changes present. Stereos in November, 1919, showed definite degree of fibrosis and numerous large calcareous nodes out towards periphery and in the apices. January, 1920, bronchitis worse, slight fever, and coughing small quantities of blood. The doctor, her husband, asked whether should he take her south. Chest showed slight but definite signs suggestive of tuberculous activity, blood reaction was second class and positive fixation. Restricted activity advised, steady improvement ensued, inhibitive still second class and weak positive fixation in May. Symptoms referable to the chest reported slight or nil during the following summer. Patient going about and apparently well May, 1921.

May I now deal with the second part of my heading: "Diagnosis as aided by serological examination."

A few moments ago I described the possible range of results of the inhibitive test in cases of definite clinical or active tuberculosis. In clinical normals (that is apparently normal) as far as tests have been done, the results are almost invariably third class or negative. If an apparently clinical normal gives a first or second class inhibitive reaction we presume he is reacting to tubercle. Caulfeild noted one or two such cases with clinical observations in one of his earlier papers on the subject.

If we attempt to rely upon the test in diagnosis we are frequently disappointed, particularly if we are content with but one observation. The interpretation of the results will frequently fail to give us any help unless the test is repeated at intervals. The reason for this is that the results in most cases reporting early for examination are third class or negative, which is the same as is found in normals.

Take for example five presumably tuberculous patients coming for diagnosis. Four of them have every reason to seek advice because they are failing, they are not reacting well to tubercle, or to put it in terms of serological results, they give only third class inhibitive. The fifth case may not really need to come to the physician. He is holding his infection in check. He comes saying that at present he is really well, but has been ailing off and on for some time. He only comes perhaps because he has previously promised his wife that he would do so, but assures you he is not ill, and is carrying on his work. In this man we might expect to find a first or second class inhibitive reaction. This corroborates our suspicions, aids and decides our diagnosis of tubercle, and in addition prognoses well. But as I said above, it is quite conceivable that it might not be so necessary to diagnose clinical tuberculosis in such a case. He had at any rate a better chance than the others to recover. To paraphrase just here, "To him that hath resistance to tubercle, shall be given additional assistance in diagnosis; and from him that hath not resistance, shall be taken away," and for the present, any further aid we had hoped to obtain in his case remains undisclosed unless by repeated observations we may chance to find the blood in better fighting mood.

Of the 13 clinic cases done for diagnosis, the laboratory results were as follows: first class inhibitive none, second class inhibitive five. (One of these five gave only third class inhibitive on primary test and second class inhibitive on next two tests,) third class inhibitive eight. Later clinical and x-ray observation on the five who were second class inhibitive proved four of them to be tuberculous and in the fifth (T.S.) tubercle could not be excluded. The diagnosis was bronchiectasis following inhalation of a bone, which bone was later coughed up. This case was shown before the February meeting of the Laennec Society in Toronto. Of the remaining eight who were third class inhibitive our later opinions recorded three as non-tuberculous, one as not excluded and four as still suspect.

Of the 45 private cases done for diagnosis, cases in all of which tuberculosis was suspected in varying degrees, 11 gave second class inhibitive or better, 8 gave between third and second class, 23 gave third class and 3 gave negative inhibitive. Of the 11 giving second class or better seven were finally diagnosed clinical tuberculosis, and one of these showed tubercle bacilli in the sputum, three were suspected of having tuberculosis and in one tuberculosis was not excluded. Their symptoms were quite compatible with the idea of a tuberculous infection. Of the eight between third and second class inhibitive, three were diagnosed clinical tuberculosis, four were still suspect tuberculosis, and in one tubercle was not excluded. These totalled 19, giving better than a third class inhibitive, leaving 26 who showed only third class or negative. Of the latter twenty-six in my final tabulation, 5 were found in the column of clinical tuberculosis, 3 were in "the compatible" column, in 2 tuberculosis could not be excluded, in 13 tuberculosis was excluded as a clinical factor and two were classed as healed tuberculous lesions. One of the latter had given a negative inhibitive (a boy of 15 years who four years previously had coughed up blood showed definite chest changes on percussion and at 15 gave an intracutaneous reaction to $\frac{1}{20}$ mg. of O.T. of 30 x 70 mm. *X*-ray stereos corroborated diagnosis of tuberculosis in 1917.)

I might relate more fully the details of some cases.

A young man, F. H., who had weighed 190, and who had been exceptionally energetic, and scarcely knew his own strength, developed unexplainable weariness so that he would sleep Saturday afternoons, and most of Sundays. He had lost fifteen pounds. There were a few sweats and some chest pains, no cough, but slight mucoid phlegm. His chest showed slight indefinite changes. The stereos suggestive, but also indefinite. Tuberculin intracutaneous reaction to $\frac{1}{20}$ mg. O.T. only 20 x 15 mm., but the blood second class inhibitive and weak positive fixation. I diagnosed biological, even if not clinical tubercle, and placed him on a regime. Before he had fairly started to restrict his energies and improve his way of living he came to report bringing up a mouthful of pure blood. I took this as corroborative, stiffened the regime, carried him on tuberculin, chiefly as a means of having him under weekly observation, and in five months he had regained most of what he lost and felt much better. Tuberculin intracutaneous reaction was more marked, namely, 35 x 65, and the blood I^3, fixation doubtful. *X*-ray stereos six months later were more strongly suggestive and six months later again were presumable tuberculosis showing definite cluster in the left apex and moderate fibrosis in upper right, interpretation being made by Dr. G. E. Richards, Radiologist, Toronto General Hospital. This case was also referred to Dr. J. H. Elliott, who diagnosed definite pulmonary tuberculosis.

A second case, N. N., in which I chanced an appeal to the blood reaction for diagnosis came to me March, 1919. I found definite though slight chest changes on percussion, no adventitious sounds. Tuberculin intracutaneous test 20 x 25 mm. Suggesting an *x*-ray the patient produced an interpretation of stereo plates, which he said had decided his former physician that there was no tuberculosis. The interpretation practically decided me the other way. I made a tentative diagnosis of tubercle and he went to M. F. H. C. for seven months. Returned in January, 1920, feeling better but not well, demanding *x*-rays of stomach and chest. Blood gave second class inhibitive, negative fixation, negative Wassermann. Stereos more definitely suggested tubercle, skin reaction now 80 x 50 mm. and chest changes more marked. To me the diagnosis of tubercle was corroborated. In September patient again better in general condition. Blood result still second class and fixation negative. Skin reaction 90 x 60 mm.

A third case. "G. H., man of 43, physician. Pneumonia March, 1919, since then slight cough, very little phlegm usually, now, November, 1919, less than one drachm, tires very easily on any exercise. Limited area of impaired resonance inside the angle of the right scapula and a few small rhonchi here. Stereo plates indicate only slight suspicion of tuberculosis in right apex (a few minute clusters). Diagnosis, debility following pneumonia. Caulfeild's inhibitive reaction here gave second class with negative fixation to tuberculo antigens. Tubercle is a probable factor." This case was reported by me before the Academy of Medicine, Toronto, November, 1919 (4). Subsequently *x*-ray stereos indicated more marked changes which were presumably tuberculous and a definite diagnosis was made. In addition to making the diagnosis in this case the blood reaction prognosed favourably. This has been borne out by later developments.

All of the *x*-ray examinations were stereoscopic plates, most of them taken at the Toronto General Hospital under the supervision of Dr. G. E. Richards. His interpretation was frequently used.

In summarizing, I would say that the study of the results of Caulfeild's inhibitive and the tuberculo-complement fixation reactions, and his interpretations thereof, together with the intra-cutaneous measured tuberculin test, taken in correlation with clinical and chest observations plus *x*-ray findings, has so broadened our view of that wide-spread infection Tuberculosis that we are convinced definite progress has been made in its study, and whereas we have had to admit till now that our ability to prognose has been limited to such facilities as clinical observations, physical examination and *x*-rays, we are happy to find real assistance in a biological test, which in addition to other advantages gives us some better conception of the lines along which the fight against tubercle is waged within the body.

In an earlier paper (5) I dwelt upon one peculiar characteristic of "this most variegated symptom-complex in its incipiency." "It is not to be expected that pulmonary tuberculosis can be diagnosed in the early stages by any one simple procedure, such as the microscopic examination of the sputum or the placing of the stethoscope on the chest. The important fact, and one so often overlooked, is, that no one sign or symptom is necessarily present." It is therefore satisfactory to have further definite assurance in diagnosis, even to the point of being able to recognize the disease in the pre-clinical or biological stage, and with this advance (or inside) information, and by treatment or restricted regime, to be able to keep the patient from reaching the stage of evident tuberculosis.

Having been fortunate in having had at hand during the past year the splendid laboratory facilities in the large D.S.C.R. daily clinic, as well as in private practice, I must declare a distinct feeling of loss on occasions when the laboratory was temporarily not available.

To generalize in closing: I recall that in London, in 1913, I heard Osler state that he was in the habit of saying to his students "If you know one particular disease well you know medicine, that one disease is syphilis." Should we not feel with our broadening comprehension of the nature of tuberculosis, that the widespread infection in which this Laennec Society is most interested needs consideration from a comparable viewpoint?

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CANCER OF THE STOMACH*

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CANCER of the stomach until recently was looked upon as an incurable disease, but we now know that it is probably the most favorable type of internal cancer for surgical removal. The first successful resection of the stomach was performed by Péan in 1879; shortly afterward his operation was modified by Billroth and carried out by him and others on many patients. It has been only within recent years, however, that surgery has been looked on as the only treatment for such cases. It is unfortunate that many physicians delay x-ray examination and surgical consultation until they are sure that a malignant growth is present, and as a result many patients are subjected to operations when the time for successful results has passed, and all that is possible is a palliative operation to extend life for from a few months to two or three years.

Incidence.—About 30,000 deaths from cancer of the stomach occur in the United States each year. When the fact is considered that about 70 per cent. of cancers of the stomach originate in the pyloric third and that the majority are amenable to surgical treatment at the time the diagnosis is first made, the necessity of education of the laity and of the medical profession with regard to this condition is realized at once. At present there is a high operative mortality and a short life expectancy when all cases are considered, but this is the result of delay. Five-year cures would be obtained in a high percentage of cases if the patients had been operated on at the time the diagnosis was first made or should have been suspected.

In preparing this paper I reviewed the histories of 1912 patients operated on at the Mayo Clinic between January 1910 and January 1921 (Table 1). One thousand five hundred (78.5 per cent) were males and 412 (21.5 per cent.) females. The average age was fifty-three and seven-tenths years; the youngest patient was eighteen years of age, and the oldest eighty-one. Seven hundred and seventy-one (40.3 per cent.) of the cases occurred in the sixth decade, and a little more than 22 per cent. in the fifth and seventh decades.

Table 1

Cancer of the Stomach

Mayo Clinic, January 1, 1910 to January 1, 1921

		Per cent.
Operations	1912	
Resections	784	41.0
Palliative operations	417	21.8
Explorations	711	37.18

January 1, 1906, to January 1, 1917

Resections	531	
Patients heard from	450	84.74 of 531
Patients with five-year cures	86	19.11 of 450
Patients living fourteen years after operation		2
Patients living thirteen years after operation		5
Patients living twelve years after operation		7
Patients living eleven years after operation		4
Patients living ten years after operation		12
Patients living nine years after operation		4
Patients living eight years after operation		11
Patients living seven years after operation		7
Patients living six years after operation		4
Patients living more than five years after operation		30

Etiology.—The etiology of gastric carcinoma is by no means settled, but from what is known of malignant growths in other parts of the body trauma (mechanic, chemic, biochemic, or parasitic) must be accepted as the most important factor, and it is especially dangerous if continued over a long period. Some authors lay great stress on the diet and consider habitual over-eating, especially of coarse, hot, improper foods, or foods over-rich in protein, as of first importance. These same indiscretions are considered as predisposing to peptic ulceration. The question at once arises, therefore, of benign ulcer of the stomach as a strong predisposing factor in gastric malignancy. (Figs. 1 and 2). This subject has been much discussed at recent medical meetings; some physicians are decided that gastric cancer never develops on gastric ulcer, and others have a strong conviction that ulcer precedes cancer in a majority, if not in all the cases. My own conviction is that cancer in the stomach probably has much the same etiology as cancer in any other part of the body, and we know that chronic ulceration is the forerunner of malignancy in most cases at least. C. H. Mayo says, "The exact starting point of cancer of the stomach is unknown and probably will remain unknown, but the early cancers in this region have been seen in the mucosa on the borders of chronic ulcers."

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In the review of the cases in the series herewith reported I was impressed with the frequency of a history suggesting benign ulcer for years before the development of the malignant syndrome; and in other cases the history suggested ulcer, but on removal the pathologist found malignant degeneration. Rosenow has shown that mouth and throat infections are responsible for a large number of benign ulcers, and the fact must be accepted that destruction of cells in any part of the body always stimulates cell growth.

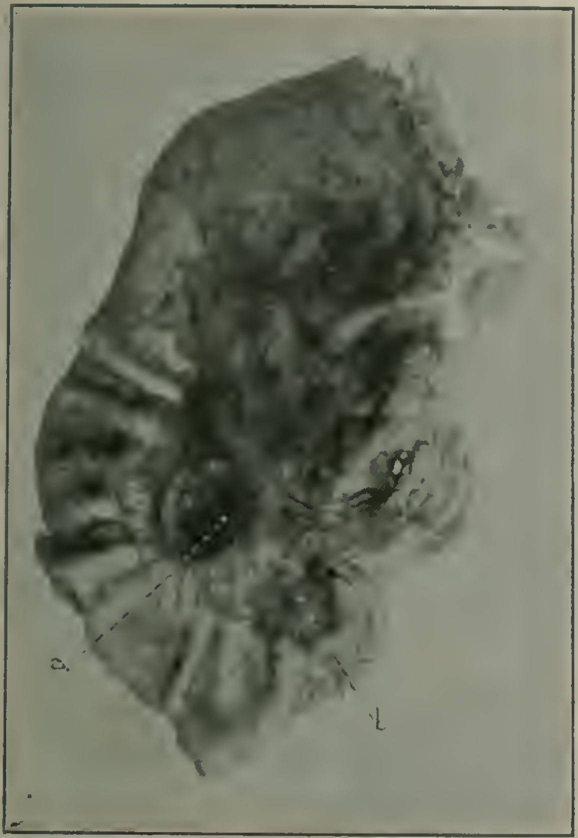

FIG. 1.—Case 300678—*a*, simple ulcer; *b*, carcinomatous ulcer.

Furthermore, it is in the character of this growth that malignancy differs from normal tissue. Besides peptic ulcers we must include, as predisposing causes of gastric cancer, tuberculous and syphilitic ulceration and actinomycosis. Unsanitary conditions of living, lack of personal hygiene, and disregard for the normal action of the gastro-intestinal tract no doubt exert an influence. Heredity appears to play a part in many cases, but the prevalence of the disease throughout the entire civilized world to some extent overshadows the family tendency.

Symptoms and physical examination.—At present symptoms definite for an early diagnosis of cancer of the stomach are not known. By early cases I mean those considered benign clinically, in which diagnosis is made only after removal of tissue. In the last ten years 1147 patients have been operated on at the Mayo Clinic with a surgical diagnosis of gastric ulcer; in 253 other patients with clinical diagnoses of ulcer the pathologists found malignant changes. It is unfortunate that, as Carman has expressed it, the patient's fate depends too much on his physician's opinion and too little on his true but hidden condition.

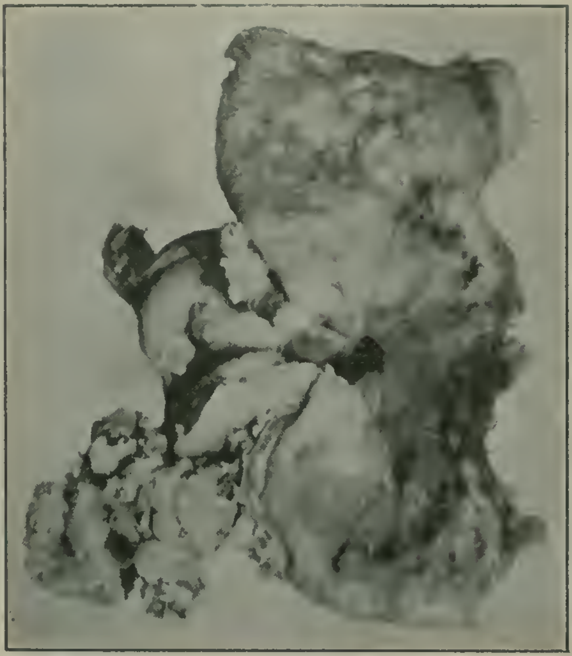

FIG. 2.—Case 264343—Carcinoma developing on ulcer.

Since a surgeon is not consulted in most cases until digestive disturbances are marked, and very often not until pain is severe and persistent, and obstruction is noted, or a tumor can be palpated, nutritional changes are striking, anæmia of a more or less marked degree is present, and there are loss of strength and weight, nausea, anorexia, and blood changes. Hæmatemesis or melæna occurs probably in one-third of the cases.

Examination of the gastric contents, especially in the cases of obstruction, reveals abnormal chemistry, occult blood, and bacilli of the Oppler-Boas group. In the early cases without obstruction, free hydrochloric acid is frequently found, and in some cases it is in excess of the normal.

When the disease is well established the appearance of the patient is very suggestive. The skin is dry and sallow, often with a slight yellowish tinge. There is more or less loss of weight and strength, and the face especially in cases of obstruction, has an anxious, drawn expression.

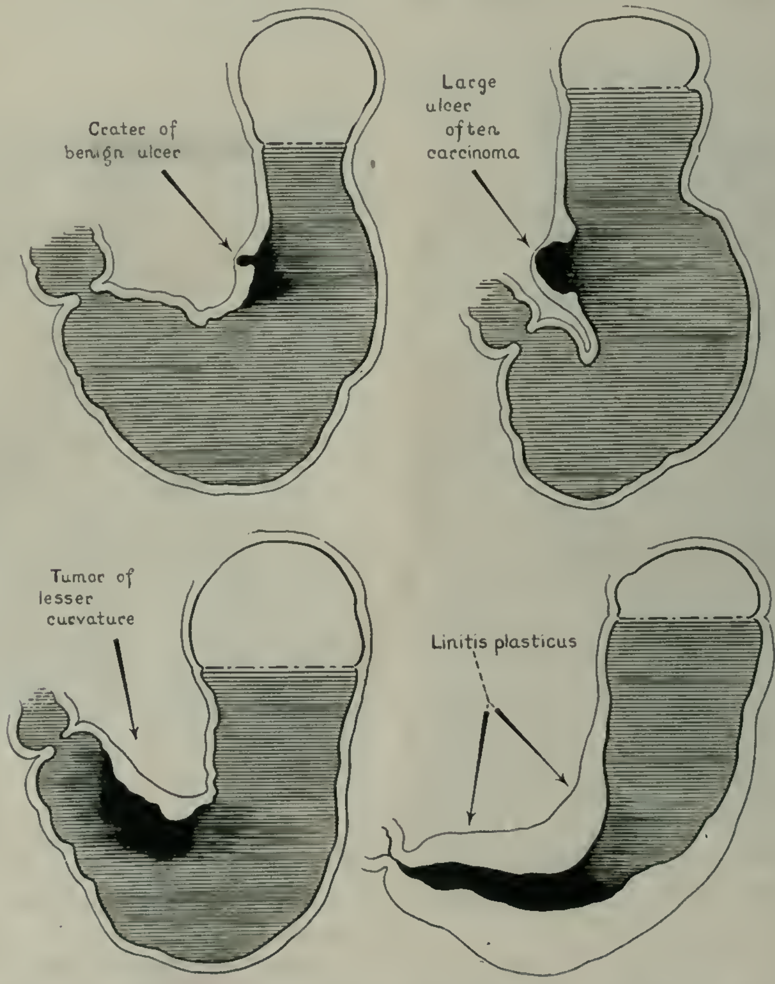

Fig. 3.—Diagrams of gastric lesions as they are observed in the roentgenogram.

Physical examination should be made in a good light, with the patient lying on a table, and if his condition warrants it, the stomach and intestines should be emptied thoroughly. It is important to have the entire anterior and lateral aspects of the abdomen exposed. Irregular prominences should be noted, as they often indicate local or metastatic growths. In palpating the abdomen no unnecessary pressure should be made, as the possibility of starting a hæmorrhage or causing perforation must always be borne in mind. Unless there is peritoneal involvement, the abdominal wall is relaxed and examination is easy. The amount of pain varies a great deal; in cases of ulceration pain is greater, while in cases of the medullary or colloid type of growth the pain is less than average. In advanced conditions fluid may be present. In about two-thirds of the cases the tumour, either definite or indefinite in outline, can be felt, and by its position and degree of mobility valuable information is gained.

A tumour of sufficient size to be palpated of necessity means one of some months' duration, but in many of these cases the disease is still confined to the stomach and many five-year cures are obtained by operation. Furthermore, many more patients are saved from death by starvation as a result of gradually increasing obstruction, and they have from one to three years' comparatively good health. They die a slow death from cachexia without much pain, which is easier for both the patient and the relatives than death from obstruction.

The examination of a patient with a gastric complaint is not complete without thorough roentgenographic studies, and the co-operation of a skilled roentgenologist is of the greatest help to the diagnostician. I am satisfied that as the number of reliable roentgenologists increases so will the number of early operations for cancer increase, and not until then can we hope to see much change in the mortality statistics of this disease. Modern roentgenologists can discover about 95 per cent. of all gastric tumours and gastric ulcers. (Figs. 3, 4 and 5). If it is accepted that a gastric lesion is present, the *x*-ray is of the greatest help in determining whether or not it is operable. This information is only of value so far as the stomach itself is concerned. It is of no help in determining the presence or absence of metastasis.

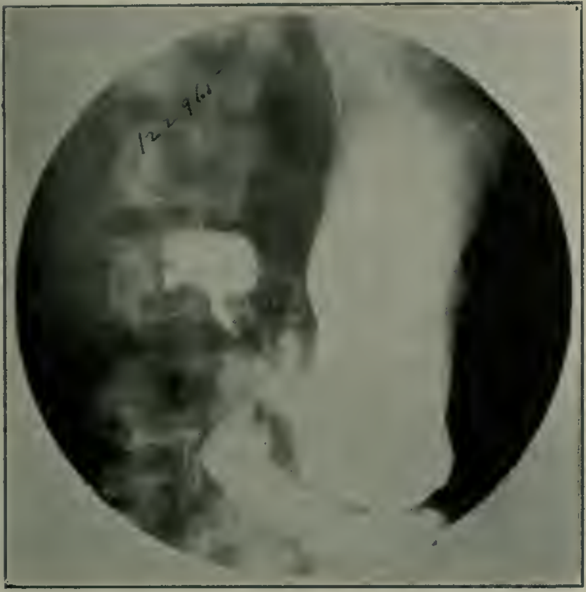

Fig. 4.—Case 122965—Operable carcinoma of the pyloric end of the stomach.

In many cases with a history of peptic ulcer it is impossible to determine whether the ulcer is in the stomach or in the duodenum until the roentgenologist's report is received. This is of great importance, as we know that primary carcinoma of the duodenum, in spite of the frequency of ulceration, is very rare, only six cases in 4,500 consecutive cases at the Mayo Clinic, while the tendency for gastric ulcers to become malignant is beyond dispute among careful observers who follow their patients to the operating room and examine both macroscopically and microscopically the fresh pathologic specimens.

Differential Diagnosis.—The differential diagnosis of malignancy of the stomach presents many difficulties, and the diseases mentioned in text books on the subject include most abdominal disturbances as well as many others to which man is heir. This is no doubt due to the fact that early cancer of the stomach *per se* does not cause symptoms on which a diagnosis can be based. Later, when metabolism is disturbed, the blood picture changed, and other viscera are involved, or obstruction occurs, a number of other diseases must be considered. I believe I am right in stating that the only cases in which a reasonably early diagnosis can be made are those in which there is a preceding history of gastric ulcer with a recent change from the periodic attacks to a constant and progressively downward disorder. Furthermore, we know that the patients we have the best chance of curing are those on whom operation is performed before this change is noted clinically and in whom malignancy is found in a limited area of the mucous membrane at the edge of a typical peptic ulcer.

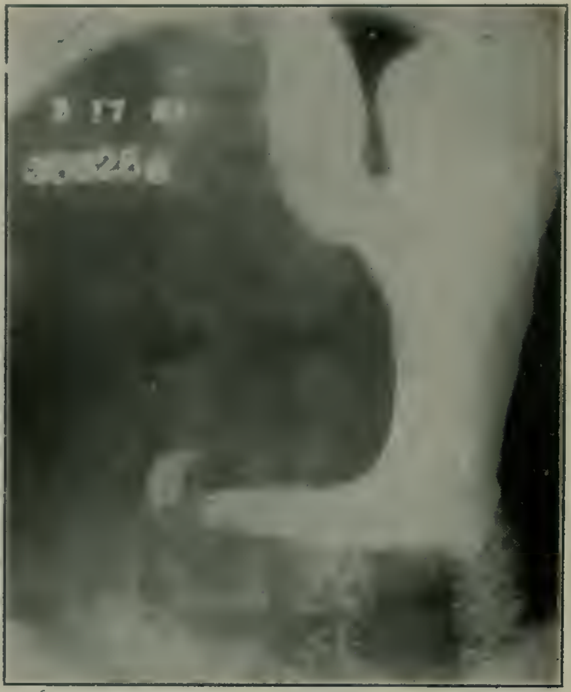

Fig. 5.—Case 358256—Linitis plastica, probably malignant.

Cancers of the stomach are artificially divided into four groups: (1) scirrhus, (2) medullary, (3) ulcerating, and (4) colloid. The rate of growth varies widely and is most rapid in the tumours in which the involvement is confined chiefly to the mucosa.

Surgical Treatment.—The location of the growth is very important from the surgical standpoint, since the closer it is to the cardia the more difficult is operation. Fortunately about 70 per cent. of all cancers of the stomach are primarily located in the pars pylorica, about 6 per cent. in the pars cardia, and the remaining 24 per cent. in the pars media. Many of the last do not come under observation until the tumour is palpable, as obstruction is a relatively late development.

The most interesting point in the morbid anatomy—I have referred to it before—is the development of carcimona on a chronic gastric ulcer. Obstruction, deformity of the stomach, and adhesions to other organs are all late sequelæ. Hæmorrhage occurs in from 25 to 33 per cent. of cases, and perforation in about 4 per cent. Metastasis occurs early in some cases and relatively late in others. The amount of involvement of the lymph glands or of the liver is frequently, as McCarty has shown, out of all proportion to the size or apparent age of the local growth in the stomach.

In all early cases and questionable cases surgery is indicated. If the hæmoglobin is below 40 per cent. one or more pre-operative transfusions of from 500 to 700 c.c. of blood are indicated. If there is obstruction, the stomach should be washed repeatedly. This is of special benefit in restoring the tone if the stomach is markedly dilated. The last washing should be within one or two hours before the patient comes to the operating room. If the patient's condition is poor, especially in the presence of chronic bronchitis or coëxisting nephritis, regional anæsthesia is the method of choice; if necessary, a little nitrous oxid or ether may be supplemented while a general exploration or traction is made on the stomach. The type of operation is best decided after carefully examining the local growth and determining the size and mobility of the stomach.

In conclusion I would urge (1) that surgical diagnosis be made early in all cases of suspected cancer of the stomach; (2) that special stress be laid on the danger of malignant changes in benign ulcer; (3) that surgeons accept their responsibility and explore more of the unfortunate patients early in the disease before the condition is such that only palliative surgery is possible; and (4) that the laity be educated to the fact that cancer is a curable condition in many cases if an early radical operation is performed.

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SURGERY OF THE GALLBLADDER AND BILIARY DUCTS*

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THE results of operations for infection in the gallbladder and bile ducts are, as a rule, satisfactory. It is important to operate early in this type of case because the later developments usually add greatly to the risk. When, as a result of long-standing disease, the function of the liver has been so impaired that there is accompanying jaundice, the severity of the condition is greatly increased, or, if the infection has extended to the pancreas, the result may be quite different.

Within the past year or two, some very interesting and important experimental problems have been carried out by Rous and Larrimore on the "relation of the portal blood to the maintenance of the liver," and on "the biliary factor in lesions of the liver," from which some practical points may be derived. Mann has shown that a dog from which the entire liver has been removed, dies within a few hours, but he has further demonstrated that if he introduces glucose into the blood stream just before death the dog is immediately resuscitated and often remains in good condition for many hours. This phenomenon is not yet understood although it is possible that it may have some practical bearing and that as a result of it, a method may be determined of substituting for the liver function for a period of time. Several investigators in this Clinic and elsewhere are working on methods of obviating the untoward influences of jaundice in such cases. Whether the condition during the presence of jaundice is due to a toxæmia, to a disturbance of the functions of the liver, or to the influence of the bile in the blood has not been proved. This is surely a fertile field for investigation, and undoubtedly some of these questions will soon be settled. Bell has recently studied biliary cirrhosis resulting from the ligation of the common duct in animals, and has shown that the common bile duct may be completely closed for a number of weeks resulting in a certain amount of biliary cirrhosis. When the relief of this obstruction is accomplished by anastomosing the gallbladder to the intestine, the liver regenerates and becomes normal in a short time. This work suggests that if something can be devised as a temporary substitute for liver function patients may often have a chance for complete recovery.

If there is a chronic pancreatitis associated with the cholecystitis this will be relieved by removing infected gallbladder. If, however, an acute pancreatitis is present with its associated fat necrosis, then the problem becomes very serious, and is probably best treated in the most conservative manner.

With regard to the etiology, especially with regard to the source of infection in the excretory apparatus of the liver, it is generally believed that these infections enter the tissues of the gallbladder and ducts by way of the blood stream and lymphatic vessels. While it is entirely possible that bacteria may gain entrance through the lumen of the bile ducts either from the liver or from the intestine, it is unusual, nevertheless, to find evidence to support the contention that infection often occurs in this manner. Infection gaining entrance by the portal circulation may pass to the gallbladder by way of the lymphatics which communicate between the gallbladder and the liver. Studies made of the source and extent of these infections emphasize the importance of the lymphatics in this region as distributors of the infection. Graham has shown, and others have corroborated, that in all cases of cholecystitis there is an associated hepatitis. Deaver and others report that certain cases of cholecystitis have an associated pancreatitis and further that in these cases the pancreatitis is secondary to the cholecystitis and that the infection extends from the gallbladder to the pancreas by way of the lymphatics. Observation and study of our own cases seems to support the contentions of Graham and Deaver, and we are impressed more than ever with the fact that these infections are rarely, if ever, confined to any one viscus. Besides the lesions in the liver and pancreas, a coexisting inflammation in the stomach, appendix or duodenum occurs so often that it must be given consideration in these cases. I have found an inflamed appendix with cholecystitis in the female, and with ulcer of the duodenum in the male so often that it seems more than a mere coincidence. I believe that in these cases the infection originates in the appendix and extends to the gallbladder and duodenum by way of the lymphatics.

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One of the problems which must be considered in gallbladder disease is the recurrence after the operation of attacks similar to the original attacks. In some instances this is due to the formation of stone or to retained infection. Undoubtedly in other instances the recurrence is due to hepatitis or pancreatitis, and these may gradually disappear. It is also possible that the remaining symptoms may be due to an ulcer or to an inflamed appendix which should be attended to at the time of the primary operation unless there is some contraindication. I have been much interested in a small group of cases that are very difficult to explain. In each of these cholecystectomy had been performed for cholecystitis, in some cases with stones, and in some without. In all there was complete relief of symptoms which lasted from a few months to six years, followed by a recurrence of typical hepatic colic, in some instances with slight jaundice. In re-operating in these cases no disease was found unless it was a slight degree of hepatitis or pancreatitis. In each instance I established drainage of bile by placing a small tube in the duct, and apparently the patients have been permanently relieved. I expected to find overlooked or re-formed common duct stones at the second operation. In each instance the common duct was dilated but had more the appearance of compensatory dilatation than of the thick-walled and greatly dilated duct seen if a stone has recently passed. In each case a search was made for pathologic changes elsewhere, but none were found. These cases undoubtedly represent a group of patients that had had hepatitis or pancreatitis or both, probably at the time of the first operation, and the recurring attacks were exacerbations of these infections. These cases, provided they are cases of inflammation of the liver or pancreas, also seem to show that hepatitis and pancreatitis may occur without any marked gross change in these viscera. This small group of cases brings up the question as to whether they should have been recognized at first, and whether they should have had common duct drainage established at the primary operation. They represent a group of cases to which, so far as I know, attention has not been called. If the recurring symptoms were due to the fact that the gallbladder was absent, it is strange that so few patients have such symptoms after a cholecystectomy. The symptoms of a recurrence must be due to some pathologic change and when this condition is recognized it may be possible to settle the question. I have seen about ten such cases.

Mann, in the Clinic, has been able to produce a specific cholecystitis by means of chemicals introduced into the blood stream. He showed that the solution gained entrance to the tissues of the gallbladder through the blood stream. He also showed that the reaction did not extend beyond the gallbladder and cystic duct. He injected chlorinated soda intravenously in dogs, and obtained the same reaction in a high percentage of his experiments. The reaction consisted in the breaking down of the capillaries and the infiltration of the wall of the gallbladder with blood. To produce the reaction he used a relatively large amount, that is about 5 c.c. to 10 c.c. for each kilogram of body weight. The reaction in the tissues of the gallbladder begins very soon and is completed in twenty-four hours. Having proved that the solution reaches the gallbladder through the blood stream he notes that the reaction is most marked when there is a good blood supply from the liver to the gallbladder. In some of the dogs a chronic cholecystitis finally developed. It seems to me that Mann's experiments demonstrate that any material in the blood stream may become lodged in the tissues of the gallbladder. These experiments support the theory of the selective activity of chemicals and bacteria and the importance of caring for dental sepsis and nose and throat infections in all cases.

Pathologic lesions in the gallbladder and ducts are in most instances manifested by a clear-cut syndrome and the diagnosis is relatively easily made. In a certain group of cases of chronic inflammation, however, the diagnosis is not so easily made and certainly may sometimes be impossible. Cholecystitis considered clinically may be grouped according to several different types:

Type 1 is marked by typical hepatic colic; the pain is sudden in onset, very severe, occurs in the epigastrium, and radiates through to the back and right shoulder. Usually it is severe enough to require morphine. After the severe pain has passed, which is usually in a few hours, there is soreness in the gallbladder region for a short time, but after that there is a remission of all symptoms until another attack occurs. These cases may run on for many years with the attacks occurring in the same manner each time, or in addition may gradually develop more or less constant symptoms, usually referable to the digestive tract, so becoming cases of gallbladder dyspepsia.

Type 2 is the so-called gallbladder dyspepsia which may occur secondary to the intermittent hepatic colic or without the forerunner, right-sided colic. The diagnosis of cholecystitis which is the cause of the dyspepsia is not so easily made if there is no history of attacks. It is much the same question that has been before us for a long time, chronic inflammation in the appendix being the cause of symptoms of gastric trouble. That the appendix and gallbladder when infected may be the cause of the dyspepsia is certain, but to say that a certain case of dyspepsia is caused by either of these when there is no local evidence of trouble in the appendix or gallbladder is quite a different matter. The first consideration in these cases is to rule out all the possibilities of the cause of the symptoms. Dyspepsia is very common and it is not likely that the gallbladder or the appendix is responsible for all of the dyspepsias that are not directly due to ulcer. Any disturbance in the cardiac, renal, or hepatic function is apt to be manifested by dyspepsia. The symptoms of dyspepsia caused by ulcer of the stomach or duodenum are entirely different from those caused by the so-called reflex condition. In ulcer cases the patients obtain relief by taking food or alkalies, while in the gallbladder cases the symptoms are made worse by food, or are not affected by it. The pain in cholecystitis cases, though varying in severity, is constant through the day, and does not give trouble at night, while the pain caused by ulcer occurs regularly at a certain time after meals and usually at a certain time at night. Certain foods especially may disturb patients whose trouble originates in the gallbladder, while all foods are apt to have the same influence in the ulcer cases, so that clinically the two types are recognizable and can be distinguished. Roentgenologists have reached a great degree of proficiency in diagnosing ulcers of the stomach and duodenum, and the differential diagnosis can often be settled by the roentgenogram. In our experience the roentgen ray has not been so helpful in diseases of the gallbladder even when stones exist. The most severe types of cholecystitis often occur without stones and without changes recognizable in the roentgenogram. Recently a new method of reaching a diagnosis of lesions of the biliary tract has received considerable attention. This consists of the passing of a Rehfus tube into the duodenum in the usual manner, followed by the introduction of magnesium sulphate directly into the duodenum, which causes the relaxation of the sphincter of Oddi and allows the bile to flow from the duct freely into the duodenum, the magnesium sulphate presumably causing contractions of the gallbladder. By this method of examination it is thought that the bile from the common duct, from the gallbladder, and from the liver ducts is obtained separately and that by an examination of the bile the existing conditions are made out. Many of our patients suspected of gallbladder disease have been subjected to this examination by Hartman; some clinicians are very enthusiastic, while we have not found it a great deal of help. However, it should not be absolutely condemned without further study. Unfortunately the condition of the bile does not always reveal the condition of the liver ducts and of the gallbladder.

Type 3 is a certain infection retained in the gallbladder over a long period,such as commonly occurs after typhoid infection. Such quiescent infections may become active at intervals and cause local symptoms. The long-standing infection in the gallbladder that acts as a focus for more or less general infection constitutes one of the most interesting problems in gallbladder conditions. The possibility of a small focus being the cause of remote symptoms is now well understood, and while too much should not be attributed to the gallbladder in these cases, there is, nevertheless, sufficient evidence to prove that the infected gallbladder may be the cause of general infection and attention to it may relieve the symptoms. It is of course essential that there be some local evidence of cholecystitis before treatment is considered.

Type 4 is a diseased gallbladder associated with migraine. We have been unable to explain their relationship but we have had a number of such cases in which the migraine was permanently relieved by treating the gallbladder. So far as I know there is no theory of infection to account for the migraine, but it has occurred too often in the large series of cases to be regarded as a mere coincidence. It is also possible that any sort of operation might have relieved the migraine as is often the case in epilepsy.

Type 5 is a disease of the gallbladder associated with changes in the cardio-vascular system. It is sometimes difficult to distinguish between a gallbladder attack and an attack due to cardiovascular disease with abdominal symptoms. In a few instances the gallbladder has been explored with the expectation of finding the trouble, when the lesion was probably cardiovascular in origin. This possibility must be constantly kept in mind. There are, however, some cases in which there is a well-defined cholecystitis associated with a cardiovascular condition. This may be endocarditis, myocarditis, or coronary sclerosis. The problem here, it seems to me, is to bring about the best compensation possible for the cardiac condition, and then to operate for the infected gallbladder. I have observed a number of such patients who were greatly benefited by this procedure. Besides the relief from abdominal attacks, there seemed to be improvement in the cardiovascular condition. It is quite possible that the gallbladder acted as a focus of infection which resulted in changes in the tissues of the heart and blood vessels.

Several problems are to be considered in the treatment of diseases of the gallbladder and biliary ducts. Most cases of cholecystitis and cholangitis are surgical though the milder ones may be treated conservatively. We are frequently confronted with the problem of when it is best to operate in the cases which we consider surgical. In the chronic cases, the operation may be performed at any convenient time. In the cases of cholecystitis without jaundice, which are seen during an attack, I believe it is usually best to wait until the attack has subsided. In choosing this plan however, we must keep in mind the possibility of rupture of the gallbladder, of extension to the pancreas, or of the development of jaundice, any of which is a serious complication, so that if the attack does not subside in the usual time it may be best to operate. If a severe degree of pancreatitis is suspected it is questionable whether or not to operate, but even with this complication, more patients will be saved by operating than by expectant treatment. The operation in cases of pancreatitis and fat necrosis must be performed with the least amount of traumatism possible. This will usually consist of opening and draining the gallbladder and of placing several small drains into the capsule of the pancreas where it is swollen and, frequently, œdematous and necrotic. It may be necessary to operate a second time after the acute stage has passed.

One of the most serious problems in these complicated cases is the presence of jaundice. Operation during the time the patient is jaundiced should, if at all possible, be avoided. If the jaundice is just beginning to show at the time the patient presents himself for treatment it may be best to operate without delay, while if he comes at a time when the jaundice is decreasing it is best to wait until it has reached its minimum. There is a great deal of uncertainty in operating on jaundiced patients. One of the greatest dangers is hæmorrhage from the cut surfaces and also from the mucous membranes, because of the marked change in the coagulation time, produced apparently by bile in the blood. A careful study of the coagulation time in the jaundiced patient does not always determine the amount of risk. A patient with a coagulation time of twenty minutes or more and a late calcium time may have none of the alarming symptoms from hæmorrhage; on the other hand, one with a coagulation and calcium time not far from normal may begin to bleed soon after the operation. If it is necessary to operate during the presence of deep jaundice, as will be the case when the duct is completely and permanently obstructed, then the coagulation time and general condition must be improved as much as possible before operating. The greatest amount of benefit will be derived from blood transfusions in conjunction with calcium administered intravenously. Transfusions should be performed before and after operation. Calcium introduced intravenously will usually bring the coagulation time to normal.

All functions of the liver must be greatly interfered with when the common bile duct is completely obstructed. The secretion of bile continues to a certain extent but not under normal conditions. The urea metabolism which takes place in the liver must be greatly disturbed as well as the metabolic process controlling the formation and storage of glycogen. In complete biliary obstruction the antitoxic power of the liver fails and the grave manifestations seen under these conditions are due chiefly to the poisons which flood the body and only in a small degree to the bile in the blood (Rollston). At the present time I think it can be safely said that the best method of combating the serious features in cases with jaundice is by transfusing with whole blood and repeating this if necessary. In many cases, after operation in which there was no bile drainage I have known the bile to start to flow soon after transfusion, and, usually, the flow is sustained, which means recovery. Furthermore, in a common duct case which is progressing satisfactorily, if the flow of bile decreases to any extent, it is almost certain to indicate further serious trouble. To restore the function of the liver or to furnish a substitute until such time as the liver is capable of taking up its work again is the apparent means of correcting these difficulties.

The question of whether the gallbladder should be drained or removed, in cases of cholecystitis, seems to settle itself when we realize the etiology of infection and the tissues that are involved. It will still be necessary to drain some of the more severely infected gallbladders, removing them later if it seems best. If there is jaundice, I do not believe it is ordinarily advisable to remove the gallbladder. One of the greatest advances in the technique of cholecystectomy is the proof that it is safe to close the abdomen without drainage in clean cases. Willis reports the first group of cases satisfactorily handled in this manner. I have closed a number of these incisions without drainage and am convinced that if the cases are selected, and the abdomen is not closed when the tissues are infected, that convalescence will be easier, there will be less infection and fewer cases of stricture of the common duct. A drain in these cases is not entirely free from serious consequences and it is absolutely unnecessary in the majority of cases of cholecystectomy. On the other hand, although it may be safe to close the common duct after removal of stone providing a small drain is placed down to the incision in the duct, I believe that in the majority of common duct cases, on account of the infection, it is better to provide the liver and duct with free drainage by placing a small tube into the duct and by suturing the opening accurately around it.

Discussion

A better knowledge of the etiology of cholecystitis is necessary, and a realization of the relationship of the liver and pancreas to infections in the excretory apparatus of the liver.

The establishment of a syndrome for gallbladder dyspepsia is required, and also a better clinical knowledge of the cases, not only those in which there are gastric symptoms, but those in which the gallbladder is the focus of infection for remote symptoms.

The devising of some plan by which we will be better able to treat the cases deeply jaundiced, and to more successfully handle those in which there is associated pancreatitis with fat necrosis, should be forthcoming in the near future.

There is a tendency to remove the gallbladder in cases of cholecystitis although less radical procedures are employed in severe cases, thus dividing the treatment into stages if necessary. Our experience in closing the abdomen in clean cases convinces us that a distinct advance has been made in this direction.

THE ETIOLOGY OF RICKETS*

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INTRODUCTION

THERE IS probably no disease which is encountered more frequently in infancy than rickets. The incidence of this disease among the children of the labouring classes in large cities varies from 40 to 90 per cent. according to the figures of different observers. It is also frequently seen in the children of the well-to-do, both in city and country districts. Although rickets is not commonly a direct cause of death, it is undoubtedly an important contributary cause in a vast number of cases. Its importance in respiratory diseases has been emphasized recently by Park and Howland.

During the past seventy-five years a great number of investigators have endeavoured to discover the cause of this disease. The theories advanced are almost without number and are apparently limited only by the imagination of the different authors. The recent work of McCollum, Simmonds, Shipley and Park constitutes a distinct advance in the elucidation of this problem. By a variation in the concentration of different elements in the diet, these authors have produced bone lesions in rats, which bear a fundamental resemblance to those found in human rickets. In this paper is given a brief review of the literature on the etiology of rickets and a presentation of some of the recent work of McCollum, Simmonds, Shipley and Park. Through their kindness a number of bone sections of rats fed on different diets are here reproduced.

THE OCCURRENCE OF CONGENITAL OR FŒTAL RICKETS

The question of the occurrence of rickets *in utero* engaged the attention of a number of investigators for many years. As early as 1853 Virchow found in a premature infant, microscopic changes in the bones, which he considered to be rachitic in nature. It is well known, however, that Virchow did not differentiate rachitic bone changes from those produced by syphilis and chondrodystrophy. Some years later Kassowitz became the chief exponent of this theory. He investigated the bones of a number of infants who had died shortly after birth or had been stillborn and found in over 85 per cent. of the cases microscopic changes which he considered due to rickets. However, his conception of the changes which occur in the bones in this disease was so mistaken that little or no importance can be attached to his views. Schwartz, Unruh, Feer, and others, chiefly as the result of clinical investigations, concluded that rickets occurred in 50 to 80 per cent. of newly born infants. The work of Kassowitz and his followers was critically reviewed by Pommer and Tschistowitsch, who demonstrated that many changes in the bones which Kassowitz had described as due to rickets were in reality the result of syphilis. The epiphyses of the ribs and long bones of 100 newly born infants were examined microscopically by Tschistowitsch, who was unable to make a definite diagnosis of rickets in a single case although in thirteen cases he found changes which he considered were possibly due to rickets. In an examination of over 100 cases Escher was also unable to establish the occurrence of rickets in newly born or prematurely born infants. Some what later the opinion was expressed by Marfan that rickets was due to a toxin or infection which acted on the bones *in utero* or during the first two years of life provided that a predisposition to rickets was present. A hereditary predisposition to the disease was believed by Siegert to be the underlying cause, while some years earlier Parrot had advanced the theory that it was due to congenital syphilis.

This much discussed question of the occurrence of fœtal or congenital rickets was finally answered decisively by Wieland, who conducted a careful clinical and histological examination of over 1500 cases. As a result of this investigation he concluded that rickets did not occur *in utero*. Schmorl, who is probably one of the greatest authorities on rickets, absolutely confirmed this conclusion. *It is thus evident that congenital or fœtal rickets if it occurs at all must be an extremely rare condition.*

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THEORIES OF THE ETIOLOGY OF RICKETS

Disturbance of the function of the glands of internal secretion.—The cause of rickets has been attributed at one time or another to a disturbance of the function of almost all the glands of internal secretion. The first to suggest a possible connection between the function of the thyroid gland and rickets was Lanz (1894). Under the influence of his work Knoepfelmacher gave thyroid extract to four rachitic infants but did not observe any favourable effect, while Heubner, who fed thyroid extract to a few rachitic children, believed that he obtained a slight improvement in their general condition. As the result of a number of experimental investigations, rickets was considered by Hoennicke to be the result of an insufficiency of the thyroid gland. No proof, however, has been given that thyroid extract exerts a favourable effect on the bone changes present in rickets.

In view of the well-known disturbance of calcium metabolism caused by the removal of the parathyroid glands it is reasonable to suppose that these glands might be concerned in the production of rickets. Erdheim (1906) found that in rats from which he had removed the parathyroid glands the dentine of the teeth remained uncalcified. It is well known that parathyroid tissue is essential to life and when it is all removed death rapidly ensues. The partial removal of the parathyroid glands is followed either by the death or by the complete recovery of the animal after a comparatively short time has elapsed. That is, partial removal of the parathyroid glands cannot be accomplished with such nicety as to give rise withany regularity to a long continued period of insufficiency. When the parathyroids are removed in the rat, in contradistinction to the results obtained in most other animals, death does not ensue, the reason being that in the rat parathryoid tissue is present in places which are not accessible and the result is that parathyroidectomy is almost necessarily incomplete. It is highly improbable that Erdheim could have produced a chronic insufficiency by partial parathyroidectomy and there is little doubt that the conditions he described were due to other causes, in all probability to faulty diets. Based on Erdheim's work, Hecker evolved a rather elaborate theory of the cause of rickets. He assumed that normally the parathyroid glands rendered innocuous certain metabolic products which exerted an injurious influence on the skeletal system while in rickets this function was lacking. What the metabolic poisons were, he did not state. The parathyroid glands of rachitic infants were examined by Schmorl, who found no evidence of any abnormalities.

Rickets was believed by Stoelzner to be due to a disturbance of the function of the suprarenal glands. He reported in detail the results obtained by the administration of adrenalin to 71 cases and concluded that its administration produced a diminution in the severity of the symptoms (cranio-tabes, rachitic rosary, enlargement of epiphyses, etc.) and also improved the general condition of the patients. The following year he reported the results of a histological examination of the bones of nine rachitic infants which he had treated with adrenalin, and concluded that he found evidences of healing. The suprarenals of a number of rachitic infants were examined by the same author, who stated that a diminished amount of adrenalin and chromaffin tissue was present in comparison to the amount in normal infants. Schmorl showed that the bone changes which Stoeltzner found could not be interpreted as healing rickets, and also that no difference could be found in the amount of adernalin and chromaffin tissue in the suprarenal glands of rachitic and non-rachitic infants.

A hypersecretion of the reproductive glands was believed by Stocker to be the cause of rickets. He advanced this theory as the result of only one experiment. Klotz reported a favourable effect on the clinical course of this disease as the result of feeding an extract of the hypophysis and concluded that this gland was a factor in the production of rickets. The carotid bodies were considered to be glands of internal secretion by Betke who stated that rickets occurred after their removal.

Mettenheimer in 1898 claimed to have produced a beneficial effect on the course of rickets by feeding thymus gland. During the past twenty years a great number of investigators have endeavoured to produce rickets in animals by the removal of this gland. (Basch, Klose, Matti, etc.) As a result of these investigations it was for some years considered that the removal of the thymus gland produced rickets. It has been conclusively demonstrated, however, by Pappenheimer in the rat, and by Renton and Robertson, and Park and McClure in the dog, that the extirpation of this gland does not cause rickets to develop in the skeleton.

Most of the investigators who have attempted to produce rickets by a removal of the organs of internal secretion have kept their animals confined in cages, generally in the dark, and in all probability have fed improperly balanced diets. This whole conception of a properly balanced diet includes not only a knowledge of the fat protein and carbohydrate content of the food but also the concentration of different indispensable organic factors (vitamines) and the ratio of the various inorganic elements. It is highly probable that many of the changes which have been obtained in animals after the removal of the different glands of internal secretion were not the result of the removal of these glands but were due to confinement and improperly balanced diets.

No evidence of any value has been advanced that rickets is due to a disturbance of the function of the glands of internal secretion.

Infection. One of the chief advocates that rickets is the result of an infection was Morpurgo. In 1902 he reported the isolation of a gram positive diplococcus in young rats with typical rachitic changes. During the next few years a number of papers on the same subject were published by this author, who considered that he produced rachitic changes in the bones of young rats by the injection of cultures of the gram-positive diplococci. The changes which occur in the bones in rickets were believed by Koch to be chiefly a chronic vascularization and the result of the action of bacteria. He injected streptococci into dogs and considered that rickets developed as the result of this. It was reported by Pappenheimer that when a number of stock rats were killed they were found to be rachitic, and he concluded that "rachitic changes in the bones and teeth occur in young albino rats as the result of spontaneous diseases possibly of infective origin." Rickets was considered to be an infectious disease by Edlefsen (1901) and quite recently Paton and Watson have emphasized the probability that this factor plays an important part in its etiology.

In human beings suffering from rickets, infections of different kinds are very prone to develop, but there is no evidence from the clinical course of this disease that infection precedes its occurrence. *The influence of faulty diets has not been excluded by the different investigators who have endeavoured to prove that rickets is due to an infectious process.*

Confinement and Defective Hygienic Conditions:—It is not surprising, in view of the fact that the causes of most diseases have been attributed by older medical authors to foul air and bad hygienic surroundings that these factors have been advanced to explain the occurrence of rickets. Glisson in (1650) in his remarkable monograph on rickets, when he speaks of scurvy as a complication, states that it may be produced from the faulty regimen of the child, especially from unsuitability of air and surroundings (1) In 1746 Astruc in his *Treatise on the Diseases of Children* states: "In order at least to check the progress of the disorder the patient should go into the country and breathe a good and free air." Toward the end of the 18th century the symptoms of rickets and many other diseases were considered by Struve to be hindered by the diligent residence in the open air. It is thus evident that the lack of fresh air is one of the oldest theories advanced to explain the occurrence of rickets.

Kassowitz has been the main advocate during the past fifty years of the theory that rickets is due to bad air. The "respiratory poisons" in the badly ventilated winter quarters of the poor people were considered by him to be an important factor in the production or aggravation of this disease. He even went so far as to emphasize the importance of the ammonia fumes from the unchanged diapers and the beds on which the children lay, and considered that the repeated inhalation of these fumes caused the infants to be more rachitic than if they lived only in an atmosphere of bad air. Wachsmuth believed that rickets was caused by an increase of CO_2 in the blood due to a lessened evaporation from the lungs through unfavourable hygienic conditions. It was thought this excess of CO_2 changed the acidity of the bone tissues and increased the solubility of the calcium salts present, thus interfering with their deposition in the bone.

In 1906 Von Hansemann advanced his theory of domestication as the cause of rickets. This theory included not only the effects of bad air but also of confinement and the general unhygienic condition of thickly populated cities. He based his theory largely on the observation that wild animals in their native state seldom or never develop rickets but when confined in the zoological gardens develop most severe grades of this disease. Shortly after this Findlay, without knowledge of Von Hansemann's work, stated that he considered that confinement was the important etiological factor in the production of rickets. The arguments he advanced in favour of this theory were the production of rickets in dogs, which he confined, and also the observation that negroes and Italians were not subject to rickets in their native lands where they spent much of their time in the open air but were almost invariably affected when they lived in large cities of the United States.

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(1) I am indebted to Dr. P. G Shipley who called my attention to the following paragraph in the original Latin edition. Some time later I found in an article on "Seventeenth Century Writings" by Still the same paragraph apparently from an early English translation.

"Scorbutus cum hoc affectu interdum conjungitur. Estque vel hæreditarius vel forté etiam in tam tenellâ constitutione per contagium contractus, vel denique de novo ex malo regimene infantis & imprimis ex inclementia æris & loci ubi educatur productus."

During the past few years a great deal of work has been done by the Glasgow school of investigators on this subject. Ferguson in a careful study of the social and economic conditions of the laboring classes in Glasgow found that the cubic space per person in families with cases of marked rickets was 32 per cent. less than in families who were free from the disease and also that the cleanliness of the house was distinctly better in the non-rachitic than in the rachitic families. She concluded that "Inadequate air and exercise seem to be potent factors in determining the onset of rickets." Paton, Findlay and Watson reported that "Pups kept in the country and freely exercised in the open air, although they had actually a smaller amount of milk fat than those kept in the laboratory, remained free of rickets while the animals kept in the labora'ory all became rickety." In view of our present knowledge of the dietary factors necessary for the production of rickets it is evident that the diets these investigators used (oatmeal and milk) cannot be eliminated as a possible factor in the production of the changes reported by them. Whether they actually produced rickets in their later experiments cannot be determined as they do not publish any photomicrographs of sections of the bones of their animals. Four weeks old puppies were confined in small cages for two months by Howland and Park and fed a diet of bread and milk with later an addition of meat. These animals developed deformities of the legs which in the living animal bore a striking resemblance to rickets but an examination of sections of the bones showed nothing but an osteoporosis. Baldwin performed similar experiments. His dogs received a diet which was considered adequate by Professor E. V. McCollum and the results obtained were practically identical with those found by Howland and Park. *A survey of the reports available shows with certainty that rickets cannot be produced by confinement alone, the diets and all environmental conditions being optimal.*

Lack of Sunlight (Effect of Ultra Violet Rays): Closely concerned with the previous theory is the suggestion made by some authors that rickets is due to a lack of sunlight. The importance of this factor was emphasized many years ago by Palm, whose carefully written report on this subject is very admirable. Neve in commenting on the conclusion arrived a by Paton, Findlay and Watson, as the result of their confinement experiments, expressed the opinion that sunlight might be the determining element in the prevention of rickets. He stated that in Srinagar where the children are poorly fed, filth diseases abound and where poverty, squalor and overcrowding are universal, rickets is practically unknown. The rarity of the disease was attributed by him to the fact that "when the sun shines whether in winter or summer the poor come out of their dirty close little rooms and work and sit about in the sunshine."

It is of interest in considering the possible effect of sunlight to observe the geographical distribution of rickets. This disease is most prevalent in the temperate zone of North America and Europe, but occurs very rarely among the natives of Southern Italy, Africa, Greece, Turkey, Persia, India, China and Japan. The climates of these countries are such that the days are generally bright and sunny. This fact combined with the seasonal incidence of rickets in the temperate zone and also its great prevalence in cities are strong arguments in favor of a beneficial influence of sunlight. The fact that in high altitudes rickets is not as severe or occurs so frequently as in the lowlands has been emphasized by Feer, who considers that mountain sunlight is an outstanding factor in the cure of this disease. On the other hand rickets is very prevalent in Rio Janeiro, which is almost on the equator. Also, it is practically unknown in the northern part of Norway, in the Hebrides and in Iceland, regions where there is little sunshine for the greater part of the year. It has been pointed out by Mellanby that in certain islands of the Hebrides the children spend the greater part of their time in dark hovels in which the light enters only through the door, and yet these children never develop rickets. It is therefore obvious that although sunlight in certain countries may be the predominant factor in the prevention of rickets the rarity of this disease in the Arctic and other regions requires a different explanation.

During the past two years a number of German investigators have treated rickets by means of the ultra-violet rays and have reported astonishingly favourable results. Four rachitic children were treated in this manner by Huldschinsky and roentgenograms of the bones showed a marked deposition of calcium after the children were exposed to the ultra-violet rays every second day for two months. At the same time, however, they were given calcium phosphate. The following year twenty-four additional cases were reported by the same author. No changes were made in the food but in most of the cases 1.0 to 1.5 grms. of calcium phosphate were given daily. The treatment consisted in exposing the chest and back to the rays of the mercury vapour quartz lamp, three times a week. The duration of the exposure was gradually increased from three to twenty minutes. In all the twenty-four cases the author considered that he attained a complete healing of the rachitic process after twenty-two to twenty-six exposures.

The favourable results obtained by Huldschenisky were soon confirmed by other investigators (Putzig, Riedel, and Erlacher). These authors made minor variations in the treatment such as the length of the exposure, the distance of the lamp from the body surface, etc., but in all cases uniformly favourable results were obtained The beneficial effects were secured without any change in the diet or the addition of any medication and were as marked in the winter and spring as in the summer. The calcification of the bones was confirmed by roentgenograms. Shortly after Huldschinsky's first publication, Hess and Unger reported the effect of daily treatment of violet rays upon five children by means of the mercury vapour quartz lamp. The entire bodies of the infants were exposed daily for twenty minutes over a period of three months but it was concluded that this method of treatment did not lead to a definite improvement in the rickets nor did it benefit their general condition. These authors also found that a "liberal allowance of light could not prevent the development of this disorder." They state: "Violet ray treatment cannot be considered the equivalent of heliotherapy. But the fact that rickets is exceptional in the arctic region where there is a lack of sunshine for the greater part of the year is a strong argument against its predominant influence. During the past year these authors have apparently reversed their views. In a preliminary note on the cure of infantile rickets by sunlight they report that the exposure of children to sunlight led in every instance to a "marked improvement in the rickets" and that "the general condition of the infants was also benefited." In the same paper and also in a subsequent communication they state that they have cured rickets by means of the ultra violet ray.

The reason for the beneficial effect of exposure to ultra violet rays is not known. The exposure of the body to either the mercury vapour quartz lamp or to sunlight produces a pigmentation of the skin. Whether this figment contains an organic factor or whether the exposure liberates an organic factor in the body which is essential for the cure of this disease is not known. With our present knowledge it is idle to speculate on this subject. *It is very probable that the actinic rays of the sun or similar rays from the mercury vapour quartz lamp have a specific effect on the prevention or cure of rickets.*

Deficient calcium and phosphorus intake (defective absorption and desposition): In view of the well known fact that tertiary calcium phosphate comprises over 85 per cent. of the inorganic constituents of bone it is not surprising that many investigators have endeavoured to produce rickets by feeding animals a diet deficient in one or both of these elements. As early as 1842 it was shown by Marchand that the bones of a rachitic child contained less calcium and more organic material than the bones from a non-rachitic infant. In 1866 Roloff considered that he produced rickets in young animals by feeding a calcium deficient diet. Young lambs were fed diets deficient in phosphorus and deficient in calcium by Weiske and Wildt, who concluded that in neither case did the diet produce any chemical or physical changes in the bone. In contradistinction to this, a few years later Voit reported that he produced rickets in a young dog by feeding a low calcium diet for three to four weeks. More recently microscopic studies of the bones of dogs fed on a calcium poor diet were made by Miwa and Stoeltzner who concluded that rickets was not present but a condition which they designated as pseudo-rachitic osteoporosis. Osteoporotic changes were found by Reimers and Boye and later by Aron and Sebauer in the bones of young animals which had been given a diet deficient in calcium. The bones from the animals used by Aron and Sebauer were examined microscopically by Gotting, who sharply differentiated the condition present from rickets. In contradistinction to the above work it was considered by Dibbelt "that the anatomical and chemical characteristics of rachitic changes in bones" were produced in the skeletons of dogs by feeding a low calcium diet. However, one of the bones from his animals was examined by Schmorl, who stated definitely that the condition was not rickets but an osteoporosis. Schmorl also was unable to produce rickets in dogs by feeding a low calcium diet. *Proof has therefore not been given that rickets can be produced by feeding young animals a diet deficient in calcium or phosphorus.*

A great number of experiments were undertaken in an endeavour to prove that rickets was due not to a deficient intake of calcium but to either a defective absorption by the digestive organs or to an inability of the body to deposit it in the bones from the blood stream. Marchand (1842) reported that he obtained considerable quantity of lactic acid in the urine of a rachitic infant and concluded that in rickets lactic acid caused a solution of the calcium of the bones which was then excreted in the urine in combination with this acid. It was believed that the lactic acid came from fermentation of carbohydrates in the intestine. The production of rickets by the feeding or subcutaneous injection of this acid was reported by Heitzmann, but shortly after it was shown by Heiss that feeding lactic acid did not increase the calcium excretion. Baginsky reported that the withdrawal of calcium salts from the diet of young animals produced rickets, but if lactic acid was given at the same time the condition became more marked. A lack of HCL in the stomach which allowed the calcium to pass through the intestines without being dissolved was believed by Seemann to be the main actor in the production of this disease. At this point it might be well to recall Wachmuth's theory in which he assumed there was an increase of CO_2 in the blood and cells which hindered the deposition of the calcium salts.

Quite recently the theory was advanced by Pritchard that rickets was due to the defective oxidation of a relative excess of food with the production of lactic acid and other organic acids which caused a withdrawal of calcium from the body. In view of our present knowledge of the inorganic metabolism of the body a loss of an appreciable amount of calcium in combination with organic acids is very improbable. *No conclusive evidence has been ad anced that rickets is due to a diminished absorption of calcium or to an increased secretion of this element in combination with organic acids.*

Errors in the concentration of the organic constituents of the diet: A great deal of emphasis has been laid on the amount of food received and the proportions of the organic constituents as a possible cause of rickets. Three main theories have been advanced, first that rickets is due to a lack of fat in the food, second that it due to an excess of carbohydrates either alone or accompanied by a lack of fat, and third that it is due to an excess of the total amount of food received.

In 1897 it was believed by Cheadle that the main factor in the production of rickets was a dietary defect. Based on Bland Sutton's experiments of successfully raising rachitic lion cubs by the addition of cod liver oil. milk and powdered bones to their meat diet, Cheadle concluded that the chief defect appeared to be an insufficient supply of animal fat and therewith also in certain cases a deficiency of earthy salts in the form of phosphates. For many years the writers of most of the textbooks dealing with rickets have considered that the main factor in its production is an excess of carbohydrates in the food. The experimental work on the effect of a lack of fat and an excess of carbohydrate on the retention of calcium salts has been reviewed by Orgler. who showed that the results obtained were so variable that no conclusive evidence could be derived fom them. Esser and later Feer have laid considerable emphasis on overfeeding as the cause of rickets. They give no experimental proof of the theories advanced.

Vitamines: As early as 1881 Lunin called attention to the fact that mice could not live on a diet of casein, milk fat, milk sugar and salts and concluded that there must be present in milk other substances which are indispensable for the nutrition. In 1906 it was stated by Hopkins that no animal could live on a mixture of pure protein, fat and carbohydrates even when the necessary inorganic material was supplied. It was considered by this author that there were other minor factors in the diet of which the body took account and that rickets and scurvy were due to a lack of these factors. Six years later he named these materials "accessory food substances." Funk, in 1912, while working on the cause of beri-beri isolated a substance which he called the beri-beri vitamine. This name has since been used to designate this whole group of substances necessary for normal growth, the exact chemical nature of which is at present unknown. McCollum and his co-workers first showed that there were at least two so-called vitamines and named them fat soluble A and water soluble B.

The first attempts to produce rickets by a deficiency of fat soluble A in the diet were undertaken by Mellanby, although Hopkins and Funk had already suggested the possibility that rickets might be due to a lack of an indispensable food substance. Mellanby's experiments are of the greatest importance as they have introduced into the study of rickets an entirely new aspect of this problem. He concluded as a result of his experiments that "it therefore seems probable that the cause of rickets is a diminished intake of an antirachitic factor which is either fat soluble A or has a somewhat similar distribution to fat soluble A." Although subsequent studies have shown that his conclusions are not entirely correct, Mellanby's work has served as a stimulus to further investigations which promise to bring about a definite solution of this problem.

The etiology of rickets as shown by the recent work of McCollum, Simmonds, Shipley and Park: Experimental rickets have been produced in rats by McCollum, Simmonds, Shipley and Park under conditions which rule out all except dietary factors. The rats were kept in scrupulously clean cages which were large enough to afford ample exercise and the rooms in which the cages were situated were airy and had the average room light. A sufficient amount of fat carbohydrate and protein was present in the diets to meet the requirements for the normal growth of the animals. The concentration of the different inorganic elements and the anti-rachitic factor which is possibly not identical with soluble A were then carefully controlled. By a variation of these factors a profound disturbances in the deposition of calcium salts in the cartillages and bones of growing rats were obtained. By means of two different types of diets it was found possible to produce changes in the bones which bore a fundamental resemblance to the conditions found in human rickets.

A number of years ago the production of rickets was attempted by feeding a low phosphorus diet but convincing results were not obtained. Recently it has been shown by Sherman and Pappenheimer, and Shipley, Park, McCollum and Simmonds in rats, and by Mackay in kittens, that the vitamine component of the diet cannot be regarded as the sole factor in the production of rickets. However, if rats are fed a low phosphorus diet *together with* an insufficient amount of the anti-rachitic factor, the other organic and inorganic constituents remaining at an optimal concentration, changes are produced in the bones which resemble those present in human rickets. (Fig. 3). It was found that the more the calcium ion was increased above the optimum, the phosphorus and anti-rachitic factor remaining insufficient, the greater was the exaggeration of the elements which composed the rachitic lesion. The second type of diets by means of which rachitic-like changes were produced in the bones of rats, contained an insufficient amount of calcium and the anti-rachitic factor, the other organic and inorganic constituents remaining at an optimal concentration (Fig. 4). The changes produced in the bones by diets with this disproportion of calcium and phosphorus differ more in minor details from the bone lesions of human rickets than the lesions produced by diets containing a low phosphorus and anti-rachitic factor. With these diets the more the phosphorus is increased above the optimal concentration the further the bone seems to tend away from the rachitic type. It is to be remembered that with the first type of diets with a low phosphorus content the rachitic changes became exaggerated when the calcium was increased above the optimum.

It is interesting to note that Howland and Kramer have shown that in most rachitic infants the concentration of calcium in the serum is normal or only slightly reduced, while the concentration of the inorganic phosphorus is markedly reduced. Kramer, Tisdall and Howland found that in infantile tetany in which rachitic changes were also present, the inorganic phosphorus in the serum was normal and the calcium markedly reduced. These findings are of considerable interest when viewed in conjunction with the above work on experimental rickets.

The results obtained from different experiments undertaken by McCollum, Simmonds, Shipley and Park tend to show that the anti-rachitic factor may not be identical with fat soluble A although it has a somewhat similar distribution. It has been found that cod liver oil contains a great deal of the anti-rachitic factor while contrary to the general impression given by a report of the Medical Research Council of Great Britain, butter fat does not contain a large amount of this element. The administration of cod liver oil to a rachitic rat on a diet low in fat soluble A and phosphorus produced in the bones a marked deposition of calcium. A similar deposition also occurs in the bones of rachitic infants after the administration of cod liver oil. This has been demonstrated by Howland and Park by means of roentgenograms. Howland and Kramer have also shown that at the same time the administration of cod liver oil causes the phosphorus concentration of the serum to be increased to the normal or above the normal level.

An insufficiency of the anti-rachitic factor alone with a normal concentration of the inorganic elements in the food will not produce rickets in rats. Neither will a calcium deficiency alone or a phosphorus deficiency alone produce rickets. The conditions produced are of an osteoporotic nature.

The confirmation of the experimental production of rickets can be made only by the microscopic examination of bone sections. Experiments in which the diagnosis is based on other criteria are inconclusive and of little value. The presence of the following changes in the bones are necessary before the diagnosis of rickets can be made.

1. Abnormal persistence of cartilage cells

KEY TO ABBREVIATIONS

OST.—Osteoid tissue
OS.—Osseous tissue
MED.—Medulla
MET.—Metaphysis
T.—Trabecula
CART.—Proliferating cartilage cells

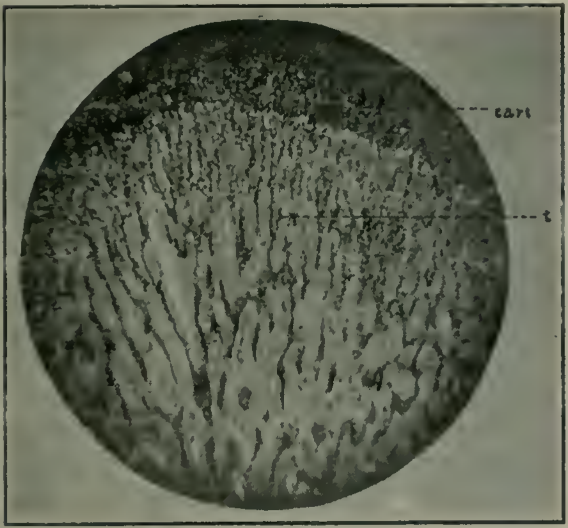

FIG. 1—A low power magnification of a section of normal bone. This shows the proliferative cartilage cells arranged in columns which do not project beyond a definite regular line which marks the provisional zone of calcification The calcium is laid down at this zone around each column of cartilage cells This produces what is called the calcified intracellular substance The cartilage cells are then removed by loops of blood vessels from the shaft of the bone Osteoblasts migrate with the blood vessels and are deposited on the calcified intracellular substance and form osteoid tissue which in turn is calcified and the bone trabeculæ thereby formed. The layer of osteoid is normally very thin (Fig. 6) but in rachitic bones this layer becomes markedly thickened (Fig. 7)

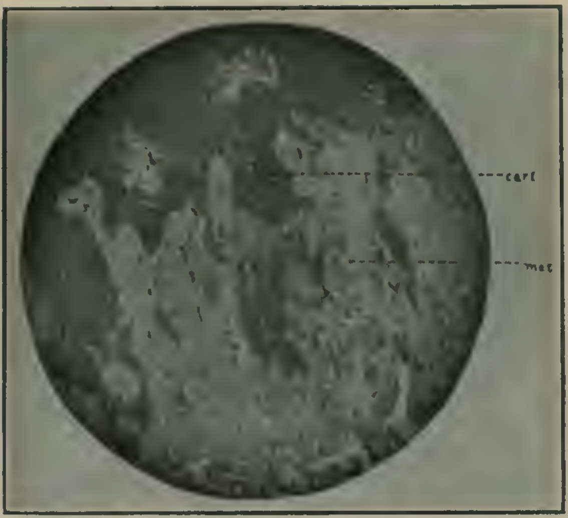

FIG. 2—A lower power magnification of a section of a long bone from a case of human rickets.

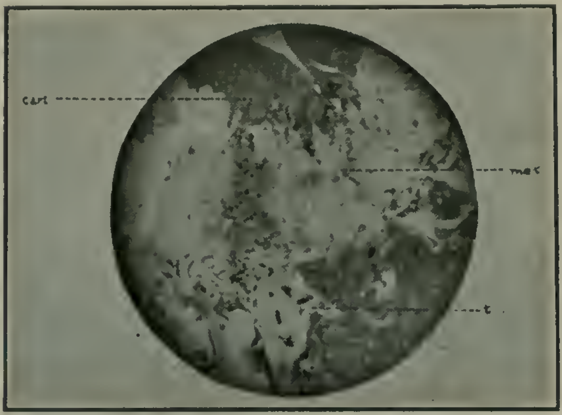

FIG. 3—A low power magnification of a section of a long bone from a rat fed on a diet deficient in phosphorus and the anti-rachitic factor The calcium intake was normal. Typical rachitic changes are present.

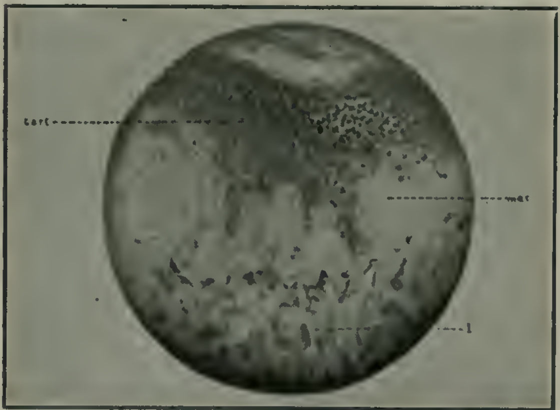

FIG. 4—A low power magnification of a section of a long bone from a rat fed on a diet deficient in calcium and the anti-rachitic factor. The phosphorus intake was normal. Typical rachitic changes are present.

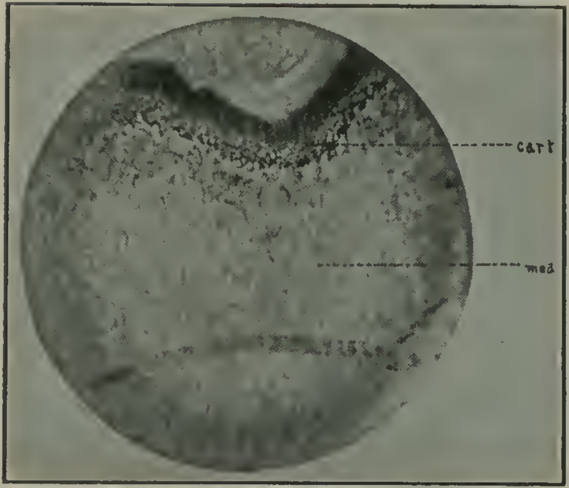

FIG. 5—A low power magnification of a section of a long bone from a rat fed on a diet deficient in the anti-rachitic factor (fat soluble A?) The calcium and phosphorus intake was normal. This section shows that there is no abnormal persistence of the proliferative cartilage cells and the calcification of the cartilage is complete. The trabeculæ are few in number and very thin. A high power magnification of these trabeculæ showed no increase in osteoid tissue. This is a typical picture of osteoporosis.

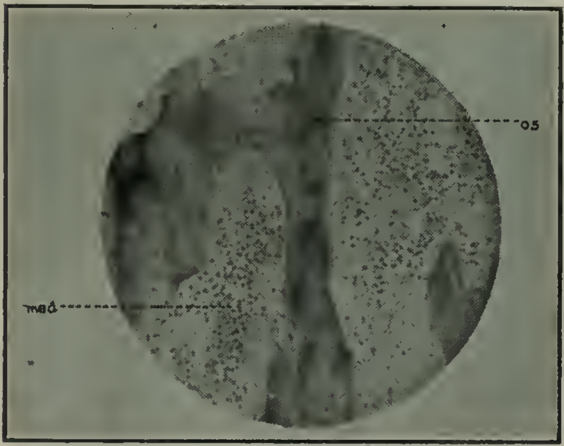

FIG. 6—A high power magnification of a trabecula from a normal bone. The normal physiological layer of osteoid tissue is extremely narrow.

which may undergo degeneration and metaplasia.

2. The provisional zone of calcification in the proliferative cartilage is either not formed or is very irregular.

3. The cartilage is invaded by blood vessels from the shaft.

4. An abnormally wide growing region or metaphysis is formed between the cartilage and shaft. This consists of blood vessels, connective tissue, islands or projection of unchanged proliferative cartilage cells, degenerated cartilage cells and osteoid tissue (bone tissue without calcium salts).

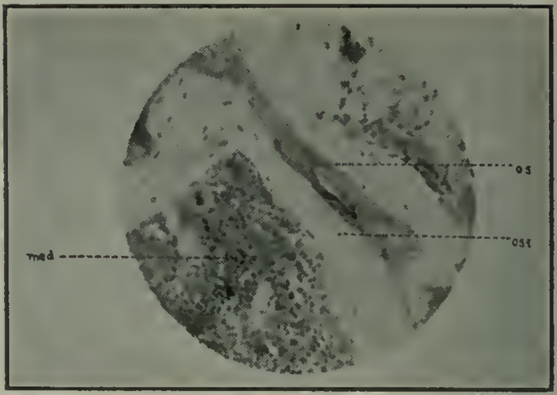

FIG. 7—A high power magnification of a trabecula from a rachitic bone (diet low in A and in phosphorus). A great increase in osteoid tissue is to be noted

5. Overproduction of osteoid.

These changes are well shown in Figs. 2. 3 and 4.

CONCLUSION

Pathological conditions have been produced in the bones of rats, which bear a fundamental resemblance to the bone lesions present in human rickets. These changes have been produced by feeding (1) diets containing an insufficient amount of phosphorus and an unidentified organic factor, the other organic and inorganic constituents being at an optimal concentration; (2) diets containing an insufficient amount of calcium and the unidentified organic factor, the other organic and inorganic constituents being at an optimal concentration.

Congenital or fœtal rickets if it occurs at all, is an extremely rare condition. No proof has been given that rickets is due to a derangement of the function of the glands of internal secretion and no evidence has been advanced that infection, confinement or defective hygienic conditions are more than contributary factors in the production of this disease. A deficiency of phosphorus alone, calcium alone or the anti-rachitic factor (fat soluble A?) alone, in the diets given to rats will not produce rickets.

The geographical distribution of rickets may be explained on the basis of the effect of the diet, and possibly of sunlight, on the prevention of the disorder. In the tropics the children are not only exposed to sunlight but their diets generally have a large percentage of leafy vegetables which contain a considerable quantity of both the anti-rachitic organic factor and the inorganic salts.

The anti-rachitic organic factor is contained in large quantities in cod liver oil and so far as it is known rachitic lesions cannot be produced by any means provided this oil is supplied in the diet. The use of fish as a staple article of food by the inhabitants of the far North gives an adequate explanation for the infrequent occurrence of rickets in that region.

The possible effect of sunlight on the prevention and healing of rickets and the favourable results obtained by means of ultra violet rays, are extremely interesting when considered with the known effect of the anti-rachitic organic factor. When cod liver oil is given to rachitic children it causes a marked deposition of calcium salts in the bones. Ultra violet rays appear to have an identical effect. The question arises whether the ultra violet rays produce or cause to be liberated in the body a substance similar to that present in cod liver oil, which stimulates the deposition of calcium salts in the bones, or on the other hand whether the beneficial effect is due to the emanation of certain rays produced by the oxidation in the body of the unidentified substance in cod liver oil, which rays might be similar to those present in the light from the mercury vapour quartz lamp, or sunlight. It is known that the permeability of plant cells for certain inorganic salts is increased by exposure to light. It is also known that fatty oils emit light on oxidation. Further experimental work is necessary for the settlement of this most interesting question.

The recent work of McCollum, Simmonds Shipley and Park, although it constitutes a distinct advance in our knowledge of the production of experimental rickets in animals, does not solve the problem of human rickets. Many children develop this disease when they receive a diet of cow's milk which contains a large amount of phosphorus and calcium. In fact, rickets may be seen in certain infants receiving almost any diet. Nevertheless, it is a striking fact that the diets of most of the children who develop rickets are ill-balanced and low in the anti-rachitic organic factor. In all probability it will be shown that rickets in the human is due to dietary defects with a possible combination in certain cases of an insufficient amount of sunlight.

The author wishes to take this opportunity to thank Professor E. V. McCollum, Miss Nina Simmonds, Dr. P. G. Shipley and Professor E. A. Park for their kindness in allowing him to reproduce photomicrographs of the bone section of rats fed on various diets. He also wishes to thank Professor Park and Dr. Shipley for their helpful criticism of the views expressed in this paper.

ADDENDA

On account of lack of space most of the references, which are over 100 in number, have had to be omitted. The following are the references to the recent work of McCollum, Simmonds, Shipley and Park. References 11-14, were received by the author while the present paper was in press. These investigators have prevented the development of rickets in rats, which were on rachitic producing diets, by exposing the rats to either ultra violet rays or sunlight.

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Retrospects

RECENT ADVANCES IN OUR KNOWLEDGE OF THE ALKALOIDS OF OPIUM

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TO the comparative pharmacology of the opium alkaloids relatively little attention was paid until the last decade. Previous investigation of their action upon the central nervous system had resulted in aligning these substances in a series extending from the greatest depressant, morphine, to the most powerful convulsant, laudanine.

In the average sample of opium next to the morphine content of about ten per cent. and contributing respectively about six and one per cent. of the total crude drug, stand narcotine and papaverine.

Narcotine stimulates the respiration. Straub (1) took advantage of this fact when suggesting its use to combat the deleterious effect of morphine upon the new-born. As an obstetric anæsthetic he offered "narcophine," a combination of the two alkaloids. It was claimed the narcotine here acted synergically with morphine as regards analgesia although antagonizing the severe respiratory depression. For similar and further reasons Bürgi (2) introduced the mixture of opium alkaloids known as pantopon; although widely used, the greatest proven advantage of the latter is that it provides a convenient form of giving accurate opium dosage.

The peripheral action of the alkaloids attracted the attention of Pal (3). He pointed out the depressing effect of papaverine upon smooth muscle and drew a distinction, based upon both chemical structure and pharmacological action, between two groups of opium alkaloids. On the one hand are the pyridin-phenanthrene alkaloids and on the other those of the benzyl-isoquinoline group. Examples of the first group are: morphine, codeine, thebaine, of the second: papaverine, narcotine, narceine. The pyridin-phenanthrene group has the property of increasing the tone of smooth muscle while the benzyl-isoquinoline alkaloids all diminish it. These results are irrespective of innervation.

Macht (4) has greatly extended our knowledge of the action of these alkaloids on smooth muscle, analyzing more closely their chemical relationships. This has resulted in associating the smooth-muscle-depressant capacity with the possession of the benzylnucleus; for example, two isoquinoline derivatives, hydrastinine and cotarnine, not possessing the benzyl group fail also to relax smooth muscle.

Such results led to Macht's discoveries regarding the action of benzylbenz oate, benzyl-alcohol, etc. which clinicians are now testing for the relief of various spastic conditions such as dysmenorrhœa, asthma, and pylorospasm. It is to be hoped that there will soon accumulate evidence based on exact observations by means of which the indications for the employment of benzyl derivatives may be clearly defined.

In the meanwhile Hanzlik (5) has produced an interesting study of the action of the opium alkaloids and related substances upon the heart. He objects to the reference to the papaverin group as "specific depressants for smooth muscle" because their capacity to inhibit tone extends also to cardiac and voluntary muscle as well as to simple forms of protoplasm.

Hanzlik finds in amphibian hearts that the benzyl-isoquinoline derivatives, papaverine, chelidonine and narcotine all diminish tone and rate. Morphine, on the other hand, is a stimulant. Thus far the chemical analogy is confirmed. Cotarnine, however, stimulates or depresses cardiac tone according to the state of the muscle at the time, and Hanzlik takes occasion to point out a number of variable effects exhibited by this drug and by hydrastinine and hydrastine. Although characterizing as too dogmatic the current tendency to distinguish sharply the two alkaloidal groups along the lines of the relation of structure to pharmacological action, his own results tend as a whole to lend support to Macht's conception.

Practical deductions from Hanzlik's work are important in reference to the employment of opium alkaloids for any purpose in conditions of cardiac weakness. Morphine, he states, would not be expected to injure the heart while some degree of circulatory collapse might perhaps be instigated by the cardiac action of the benzylisoquinoline group.

The "stimulating" effect of morphine upon the heart is probably never exhibited in the clinic, for (aside from the difference in species) the concentrations of morphine presumably required would be toxic to the nervous system. Furthermore as Hanzlik points out, stimulation of cardiac tone and rate may mean decreased instead of increased cardiac output, complete filling of the organ being interfered with.

Evidently many results of value are to be expected from the continuation of work upon the opium alkaloids along these lines.

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SURGERY IN THE TREATMENT OF PULMONARY TUBERCULOSIS

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Montreal

FROM the day of Hippocrates to that of Brehmer, Detweiler, and Trudeau, there was but small abiding place for Hope in the breasts of those who were charged with the care of the phthisical sufferer. She took lodgings instead with the sufferer himself, and often gave him more ease than did his physicians. At last there came Brehmer, who substituted the sanitarium for the home, the open window for the closed one, fresh air for the room stove, good food for a low diet; and thereby saved many lives. His principles stand today as fundamental in the treatment of tuberculosis. But there remained many patients, as there still remain many today, in whom the destructive effects of the tubercle bacillus precluded all hope of ultimate cure; even though, with the help of sanitarium care and a strict invalid regime, they were able to hold the horrid spectre at bay for a time. Such were "the chronics," at once the triumph and the despair of what our friends to the south call "tuberculosis therapy." In former days these died early; now they die late, or, at any rate, later. Yet is their life a burden,—to themselves a burden physical and mental; to those who pay, a burden financial.

What is their lesion? Cavities and fibrosis and erosion of vessels. What is their life? Cough and expectoration, the handkerchief and the sputum box, the reclining chair and magazines, or bed rest and the tray. And their outlook? On the whole, downward. And yet, to these also came fresh hope when Forlanini introduced, now over thirty years ago, his method of artificial pneumothorax. Even today, the general practitioner is largely ignorant of this beneficent procedure, which has brought healing to thousands who were otherwise doomed. The injection of nitrogen gas into the pleura of one side, the other lung being practically sound, compresses the lung, puts it at absolute rest, inhibits the respiratory movements of that side, and thus allows Nature to complete her reparative fibrosis undisturbed. Itwas an enormous therapeutic advance. But its limitations soon became evident, of which the chief proved to be pleural adhesions so extensive as to obliterate the pleural space, and thus to render impossible the injection of air. At this point, surgery came upon the stage. If the problem is to put the lung at rest (so argued the pioneers) and if artificial pneumothorax is impossible, resection of a number of ribs ought to accomplish that object. It would occupy too much space to relate the history of surgical progress in this line. It began in the late nineties of last century. The early workers were all German and Swiss: Spengler, Brauer, Turban, Friedrich, Wilms, and, last and most important, Sauerbruch. A recent article of the last-named forms the text of this writing (1). At first the extent of the rib resection was too small, and little good was done. Friedrich made it too great (1907-1910) and lost an undue proportion of his patients (25-30 per cent.) through shock, pulmonary œdema, and failing heart. Sauerbruch seems to have struck the happy mean; his operation is now standard; and his results are astonishingly good.

Technically the procedure, which is called extrapleural thoracoplasty, consists in the removal of portions of all the ribs behind, from the first to the tenth inclusive, usually in two stages. The pleura is not to be entered. This cutting of the bony framework allows the ribs to sink in, and x-ray photographs show a collapse and a compression of the affected lung but little short of that effected by a complete pneumothorax. Not only is the lung, and its contained cavities, compressed, but it is also prevented from going on with its physiological work. It no longer breathes; its movements are abolished; it rests. Nature's efforts at repair are therefore unhindered. She gradually replaces diseased tissue with fibrous tissue; healing advances through scar. Such, briefly, is the rationale of the method And it can be replaced by no other, because it comes into its right only when all others have failed.

Sauerbruch's article is a general one. The chief points may be resumed somewhat as follows. Surgery can indubitably cure certain forms of pulmonary tuberculosis. Patients of the chronic type, with cavities, expectorating large numbers of bacilli daily, can be made free of cough, sputum, and bacilli; and therein lies the great social-economic importance of surgical treatment, in that such patients become innocuous to their community. This type, with old standing fibrosis and cavities, is the best for surgical measures. Cure is by fibrosis, that is, scar; and scar means contraction. The flattening of one side of the chest, the narrowing of the intercostal spaces, the pulling up of the diaphragm, and the pulling across of the trachea—all these show Nature's efforts to cure. But these are often insufficient; cavities remain, and are held wide open because the chest wall, after all, is rigid, and pleural adhesions fasten the lung to the ribs. Reason fairly clamors for a breaking of the bony ring of the thorax that the lung may be allowed to collapse. It is obvious that the other lung must be healthy, or practically so; and it has been estimated that only about 10 per cent. of all cases fulfil this indication of relatively unilateral disease. Moreover, inasmuch as artificial pneumothorax is possible in about half of these, and is always first to be tried, there remains only about five percent. of all cases for which surgical procedures come to be considered. Yet even this small percentage, considering the enormous numbers of the tuberculous, represents a very large field for surgical endeavour. Although the rule holds that one lung must be practically healthy, a slight, old, and arrested lesion in it does not constitute a formal contraindication. Yet it is important to be sure that such a lesion is really arrested; and upon this point the opinion of the expert in tuberculosis, especially if based upon an extended period of observation of the case in question, is of the greatest value. The danger lies in the extra work suddenly put upon the sound lung by a rib resection (or indeed a too rapidly induced pneumothorax) on the sick side, and a consequent lighting up of supposedly arrested disease. Ordinarily, tuberculosis invades both lobes, even if confined to one lung; so that a rib resection must include practically all the ribs on the affected side. Yet in many cases the disease affects the upper lobe first and worst. Thus it happens not infrequently that the pleural space is obliterated over the upper lobe and remains free over the lower one, and an artificial pneumothorax will be found to compress effectually the lower lobe, the upper one remaining untouched. The latter is also more often the seat of cavities. Under these circumstances Sauerbruch recommends strongly the carrying out of a thoracoplasty over the upper lobe (resection of the first to the fifth or seventh ribs) while leaving the lower to be compressed by the artificial pneumothorax. This he thinks an ideal combination. The lower lobe, after healing, can then be gradually allowed to resume its function, while the cavity-containing upper one remains permanently compressed by the thoracoplasty. A total thoracoplasty (first to eleventh ribs inclusive) brings about a shrinking in the volume of the lung amounting to 300 to 500 ccm. At this rate, cavities if not too large, can be obliterated by the approximation of their walls. More important, in the reviewer's experience, is the fact that the normal respiratory movements of the thoracic cage are abolished, and the lung no longer expands and contracts; it is put at rest. The breath sounds, on auscultation, become blowing, transmitted from the main bronchi; the vesicular murmur and râles disappear largely.

After a few paragraphs upon technique, the anæsthetic, the after-care, the occasional employment of phrenicotomy in the neck to paralyze the diaphragm on one side, and the necessity in a few cases of apicolysis, Sauerbruch goes on to quote his results. His Zurich experience amounted to 381 cases; that of Münich (October 1918 to February 1921) 57 cases. In the latter, the operative mortality was nil, as the earliest death occurred from pneumonia eight days after operation. Mortality within the first four weeks was 7 per cent.; while in Zürich it was 12 per cent. In fifteen patients, that is 26 per cent., sputum was abolished altogether, and "cure" was to be expected. Forty-two per cent. were improved. The remaining 25 per cent. remained unchanged or grew worse. Late deaths are hardly to be ascribed to the operation. These late figures correspond pretty well with those of the Zürich experience, published in his large book on Thoracic Surgery (1920) which showed 35 per cent. "cures" (disappearance of cough, sputum, and bacilli, ability to work, general well-being); and 40 per cent. "considerably improved." And when (he says in conclusion) we consider that the patients referred for surgical treatment are practically all only such as have already undergone long years of invalidism in sanatoria, seriously ill people with cavities, whose sputum is loaded with bacilli, we need hardly be ashamed of such results.

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BRONCHIAL ASTHMA

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IT is undeniable that our conception of bronchial asthma has undergone a radical change in the last decade. In 1911, at a meeting of the British Medical Association, at which this subject was discussed, asthma was regarded as a reflex neurosis, and the only reference to the modern view was the hint thrown out by the late Dr. G. A. Gibson that an explanation might eventually be found along the lines of anaphylaxis. Since then so far has the pendulum swung that in a recent work on Medicine (Miller in Nelson's loose-leaf system) asthma is defined as 'an anaphylactic manifestation characterized by recurrent attacks of paroxysmal dyspnœa, due to spasm of the bronchioles, developing as a result of exposure to a foreign protein to which the individual is sensitized.' As Rolleston says in a recent paper, "this may be too exclusive," and it is probably preferable to adopt Freeman's view that three factors are necessary: First, the protein sensitization; second, the hereditary diasthesis; and third, precipitating nervous influences. Whether or not nasal polypi act as a reflex nervous irritant *per se*, or by favouring the growth of bacteria, or both, or by favouring the formation of a new protein is open to discussion.

As pointed out by Charles McNeil, the name "Anaphylaxis", and the first experiment that demonstrated it, came from France. C. Richet, in 1902, while studying the toxic action of the glycerine extract of the tentacles of sea-anemones, found that reinjection of a dog with this extract, after an interval of a few days, was followed rapidly by general collapse, distressed breathing, vomiting, diarrhœa and death. To this reaction, he gave the name "anaphylaxis", or something opposed to immunity.

Meltzer in 1910 drew attention to the similarity between bronchial asthma and anaphylactic shock. Experimentally, a guinea pig may be sensitized to horse serum by injection. If after ten days or so a second injection is given, the animal dies of asphyxia, due to spasm of the smooth muscle of the bronchioles, so that exchange of air ceases. This result may be counteracted by the use of adrenalin or atropine. Sewell further showed that guinea pigs after previous sensitization, may react to intranasal instillation of horse serum by developing typical bronchial asthma. Brodie and Dixon showed that the vagus is the only motor nerve to the bronchial muscles, and contains both constrictor and dilator fibres, and that spasm of these muscles, especially the circular fibres, is produced by irritation of the nerve itself or of the respiratory mucous membrane. Therefore, by putting these facts together, we can see how protein applied in the upper respiratory tract of a sensitized animal, irritates the constrictor fibres of the vagus, and produces a stenosis of the small bronchi by causing a spasm of their circular muscles; and in this way the mechanism of a typical attack of bronchial asthma is explained. Dale has made an important contribution to the understanding of this subject; he has shown that there are two main effects in the anaphylactic state: first, a depression of capillary tone as a result of injury to the capillary endothelium; and second, an increase of tonus of the plain muscle throughout the body. These two factors differ in their intensity and in the amount of representation in different animals. Thus, in guinea pigs, death occurred from intense constriction of the bronchial muscle; and in rabbits, from acute distension of the right heart owing to constriction of the pulmonary artery and its branches; that is, from the second factor. On the other hand, in cats and dogs, general capillary engorgement and resulting arterial depletion, take the primary place. In this connection, the influence of anæsthesia is interesting, as it may modify or prevent anaphylaxis in guinea pigs and rabbits, but not in cats and dogs where the constriction of the smooth muscle is not the main factor. Another significant point is that Dale produced these typical effects by the use of histamine, an anino-body, or in other words a split protein product. With the foregoing explanation, then, we can define "*anaphylaxis*", or as it is sometimes called "*Allergy*", after Von Pirquet, as *a state of hypersusceptibility of an animal towards a foreign protein to which it has been made sensitive by previous innoculation.* The anaphylactic shock is due to the meeting of the second dose of protein (antigen) with the specific antibodies set up by the first dose. The result is a splitting of the second dose into poisonous split products, which cause the characteristic reaction. The result is determined, we know not exactly how, by the tissue or organ affected. For instance, if the eyes and nose and throat are affected, the result is *hay fever*; if the bronchi, we get *asthma*; these are both due to inhalation of the poisonous protein. If ingested, the result may be *vomiting and diarrhœa*; while skin manifestations include *eczema, urticaria* and *angioneurotic œdema.* Dr. Freeman has placed these conditions under the inclusive term "the toxic idiopathies."

Chandler Walker divides asthma into two types: (1) typical bronchial asthma, to which the foregoing explanation applies. In this type the patients are protein sensitive, and therefore anaphylactic; and (2) atypical bronchial asthma, better called "asthmatic bronchitis." The primary cause of the latter type is bacterial infection, whether in the nose and throat, bronchial tubes, teeth, tonsils, sinuses, gall, bladder, or in any other site. Proteins are not the cause, so far as we can tell, unless it be a bacterial protein. It is not always a simple matter to distinguish between these two types, but as a rule the true asthmatic is usually free from symptoms between attacks; the dyspnœa is expiratory in type, and it is only towards the end of the attack that cough is at all marked. In asthmatic bronchitis on the other hand, the patient has usually had bronchitis for some time; there is cough from the start, and there may be fever. The dyspnœa is chiefly inspiratory, is increased by exertion, and some bronchitis still remains after the attack. In a large number of cases examined these two types were about equally divided.

The *technique* for determining protein sensitization is as follows: A series of small cuts which should not draw blood are made on the previously cleansed forearm. On these are placed a small amount of the protein to be tested and a drop of tenth normal sodium hydrate to act as a solvent. After about half an hour, these drops are wiped off. A positive reaction is determined by the development of an urticarial wheal $\frac{1}{2}$ cm. or over in diameter, or a surrounding zone of erythema while the control remains negative. The proteins usually tested comprise (1) the epidermals or animal emanations, such as horse dandruff, cat hair, dog hair, sheep's wool, chicken feathers, etc.; (2) the pollens in patients suffering from seasonal hay fever or seasonal asthma, using those of timothy, red top, orchard grass, etc. for cases met with in spring and those of rag weed and golden rod for cases met with in autumn; (3) food proteins—this covers a wide range from soup to nuts, but the important thing is to test out the patient first with the various foods which he eats; (4) bacterial proteins—the reactions to these are not uncommonly delayed. In Walker's series of over six hundred cases, forty-eight per cent. were protein sensitive, and the remaining fifty two per cent. failed to give a reaction. Of the sensitive cases, one hundred were due to epidermal proteins, chiefly horse dander; seventy-four cases were due to foods, of which thirty-six were caused by cereals, the most important one being wheat, and thirty-eight were due to other foods such as egg, milk, potato, fish, etc.; sixty cases were due to bacterial proteins connected with the developments of the staphylococcus aureus, streptococcus hæmolyticus, staphylococcus albus and streptococcus viridans, mentioning them in the order of their frequency. In sixty-six cases, pollen protein was proved to be the cause of the brochial asthma.

The age of onset of asthma in its relationship to sensitization is very important. In Walker's experience, four-fifths of those who began to have asthma in infancy were protein sensitive; in childhood, two-thirds; in young adult life, one-half; in adult life, one-quarter; and after fifty, none were sensitive. Half the epidermal cases began to have asthma before the age of ten years. Of the foods, egg, milk and the cereals are most commonly the cause in young children. The coexistence of eczema and asthma in children points to a food protein. Multiple sensitization, by which is meant the reaction to more than one protein, is more commonly met with in those in whom asthma began in childhood.

Of considerable importance also is the occupation of the individual, and in this connection could be discussed, had we space, the interesting question of acquired or latent hypersensitiveness, as in the case recently reported by Rosenbloom, of a man fourty-four years old, who had been a baker for twenty-six years, but had had asthma for only fourteen years, with an acute attack every second or fourth week. He was tested with one hundred and thirteen proteins, yet he gave positive reactions only to rye and wheat globulin. Jewel polishers sometimes develop symptoms from the orange-wood or box-wood with which they work.

In connection with acquired hypersensitiveness, Schloss reports five cases of children who subsequently became sensitive to egg and lactalbumin, following attacks of enteritis, when presumably the damaged mucosa allowed the passage of the unaltered protein.

There is commonly a marked hereditary factor, and it is important to inquire into the family history for hay fever, eczema, urticaria, angioneurotic œdema, etc. In nearly half the total cases, such a history is obtainable. Cooke and Van der Veer say that what is transmitted is the capacity or tendency to form specific antibodies to any form of protein.

The treatment of the protein sensitive cases is on the whole gratifying. Walker claims that 75 per cent. to 82 per cent. were relieved. The food cases are probably best relieved by the withdrawal of the offending protein from the diet; desensitization by feeding the protein is a laborious and often an unsatisfactory procedure. Heat, however, will sometimes render the protein innocuous. The epiderma' cases are readily desensitized by innoculation with gradually ncreas'ng doses of the protein dissolved in alkali Practically, however, as for instance in a horse dander case, it is needless to desensitize a patient who fails to react to a weaker than one in a hundred dilution, as intimate contact would be required to cause symptoms in such a case. The pollen cases, and this applies particularly to hay fever, are treated by desensitization in the preseasonal period.

Of the nonsensitive cases, and the bulk of these are past middle age, treatment of the bronchitis by means of autogenous vaccines obtained from the sputum, often leads to amelioration of symptoms. At the same time, realizing that there are contributory causes of asthma such as climatic, hygienic, infective and psychic influences, these should be attended to, and focal infection and reflex causes should be sought for and removed wherever possible, and an attempt made to build up the patient's resistance.

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Case Reports

TRAUMATIC ANEURYSM*

Chas. K. P. Henry, F.A.C.S.

Montreal

S. B., white, male, age 21 years, first came to the surgical outdoor clinic of the Montreal General Hospital in the afternoon of January 28, 1921. He had just stabbed himself with a butcher knife between the index finger and thumb of the left hand. The blood spurted several feet and he had had an esmarch applied. The wound, one inch long, was closed by the house surgeon, Dr. H. F. H. Eberts, with two deeply placed silk worm gut sutures which controlled the arterial bleeding.

Six days later, as there was some redness of this area, the sutures were removed and evaporating lead lotion was applied. Five days later the hand was swollen and there was superficial fluctuation, which was incised after a saline bath.

On February 14th, seventeen days after the injury, he was offered to me for my clinic for third year students for that day on "acute infections," to be shown "before the abscess was incised"! My first touch of the finger was surprised by a forcible pulsation.

The outdoor case card, S-1228-21, has recorded our findings at the clinic:

There is marked fulness on the dorsum of the left hand over the region between the first and second metacarpal bones. This is reddened, swollen, tender, with increased surface temperature and a visible arterial pulsation. Fluctuation is present. There is a raised area of redness $2\frac{1}{4}$ inches by $1\frac{3}{4}$ inches, over whose summit vertically is a linear scar $1\frac{1}{2}$ inches, slightly broadened at the upper extremity, from which sero-pus is exuding. A bruit was to be heard over this area. There was partial anæsthesia over the adjacent sides of the thumb and index finger and function of these was slightly impaired. Digital compression of the radial artery just above the wrist caused the pulsation to cease.

He was admitted to L service immediately and an esmarch attached to his bed and the ward nurses warned to watch for secondary hæmorrhage.

Next day, February 15th, under general anæsthesia, I tied off the radial artery by two ligatures of catgut, one-quarter inch apart, just above the wrist joint. The pulsation almost ceased in the aneurysm, but not entirely. The ulna artery was then exposed at the same level and on compressing it the pulsation ceased entirely. It was tied by a single ligature. It was noted that the capillary pulsation under the finger nails remained good.

Three days later he was discharged—both wounds were clean. The swelling was less, though some bloody pus was still discharging from the superficial abscess incised on February 8th. The hand was colder than the right, no anæsthetic areas were present, all movements were free. The capillary circulation was good, and there was some sweating of the hand. The colour was normal. There was no pulsation at the site of the aneurysm. He was referred back to the surgical outdoor, where on February 24th the sutures were removed. No pulsation was then to be felt. On the 24th of March he was re-examined in the surgical outdoor department. Both hands were equal in color, temperature and function. There was absolutely no pulsation at the site of the aneurysm. He had been working since about the 1st of March.

A SURGICAL CURIOSITY

G. W. T. Farish, M.D.

Yarmouth, N.S.

I WOULD like to report to your Journal a surgical curiosity which occurred in my practice recently. I was called in consultation to see a case of Mrs. C. S., age 33, who had been suffering excruciating abdominal pain for twelve hours, with vomiting; the pulse was 96, and there was some tenderness over abdomen possibly more marked over McBurney's point. As she was under the influence of morphine when I saw her, the symptoms were somewhat masked and therefore difficult of diagnosis. She had a history of having been operated upon in September 1919 in a hospital in another town by a very skilful surgeon for some uterine condition. As she did not know definitely whether or not her appendix was removed it made the diagnosis more difficult. However, this rested between appendicitis and an obstructive condition of the intestines. The patient was thirty miles away, and I went prepared to operate if necessary. It was decided to open the abdomen and substantiate or otherwise our preoperative diagnosis. I found the appendix intact, and apparently healthy, but the small intestine was red, distended and œdematous, and upon seeking farther for the trouble, found in the small intestine somewhere, I should judge, between the jejunum and ileum a lump which filled the entire lumen of the gut, and which had the feeling of a ball of hardened fæces. As it seemed to be the offending member I slit open the bowel, took out the lump on gauze, disposed of it on the floor and repaired intestine and closed abdomen. Upon investigation afterwards I found that the lump consisted of a bunch of hospital gauze about as large as a hen's egg, which when unfolded and spread out measured eleven by thirty inches. As I had never met such a condition before I was at a loss to know where that gauze came from. Several suggestions were made, viz., that in a fit of hysteria she ate it; another, that it was left in the abdominal cavity at the time of her first operation and had ulcerated through into the intestine, but there were no adhesions.

I would like some of the surgeons who may happen to see this to give me their version of the journey which this gauze made after it left the operating room.

Editorial

OUR JOURNAL

WITH the appearance of the last number of the Journal for 1921 the Editorial Board desire to call the attention of their readers to the difficulties under which both editors and publishers have laboured during the past six months owing to the continuance of a printers' strike in all the publishing offices of the Dominion. To this the diminished size of one number and the lateness of the appearance of other numbers during the past few months have been due. It is the hope of the publishers that most of these difficulties have been overcome, and that with the beginning of the New Year the *Journal* will once more make its appearance during the first week of each month. During the past few months, owing to the high price of paper and to the high wages demanded by printers, the cost of printing the *Journal* has very considerably exceeded the income received from the fee charged for membership in the Association. Notwithstanding the increase in cost and the consequent large indebtedness incurred by the Association, the Executive have acquiesced in the recommendation of the Editorial Board to an increase in the size of the *Journal.* For the first half of the last year this amounted to about fifty per cent., while in the past few months the number of reading pages has been almost doubled.

It is hoped that in the coming year the increased revenue which will arise from a larger membership in our Association as well as the increased fee to be charged for membership will permit the Editorial Board to continue, and perhaps add to, the present amount of reading matter.

While the members of the Editorial Board feel that they can look back upon the various improvements that have taken place in our *Journal* during the past year with some pride, and also the consciousness of more earnest thought and energetic work expended in the preparation of each number, they are also well aware that there is still room for improvement before the *Journal* can take its place as a full and complete exponent of medical thought and medical affairs in the Dominion. To become such an exponent, we desire to publish papers that may prove of interest to the general profession, from every province of the Dominion, provided such papers present in a clear, concise and readable form the careful observations, the well-considered thoughts, and the interesting experiences of the writer on any subject in medicine. Such articles if short and concise will we are sure always be read by the earnest, but often busy practitioner. Long articles with many quotations from standard works are not only expensive to print, but as a rule are merely glanced at or skimmed over by the physician who has few spare minutes. Papers in some of the specialized departments in medicine and surgery will be published from time to time provided that they present facts of interest useful to the general practitioner. In our Retrospect Department we hope to place before our readers each month a review of one or more important subjects to which much recent thought has been given or in which definite advances have been made.

We hope to be supplied regularly with all the recent news of the profession in each province, and in the department of abstracts from current literature we hope to supply our readers with the gist of all important current literature, European and American. In the effort to present in a monthly journal the medical thought and work of our Universities and Medical Societies throughout the Dominion, it is absolutely necessary that for the current year papers so far as it is possible be *concise as well as clearly typed*, and for the present the Board muts reserve for itself the right to shorten or abbreviate papers exceeding 2500 words, provided such abbreviation can be made without detriment to the value of the article. This is a right, however, that will be exercised as seldom and as carefully as possible. In its work the Board hopes to have the sympathetic assistance of every province, and the support of every member of the profession in Canada.

OXYGEN THERAPY

THE successful administration of oxygen as a therapeutic agent has been a subject of debate for many years. Its technique and its results have always been open to question, and not until quite recently has the whole matter been taken up in a genuinely scientific way, with careful determinations of the blood gases.

In the last number of the *Archives of Internal Medicine*, Barach and Woodwell of Boston have presented a very lucid account of the subject. As is already well known, Barcroft shewed some years ago that any activity of the body organs involves a call for oxygen, and any increased work on the part of the heart, kidneys, muscles and secreting glands, can only be done with a proportional increase of oxygen consumption. As Haldane and others have shewn, the lack of oxygen is manifested by periodic breathing, impairment of the mental faculties (symptoms like alcoholic intoxication), an later, nausea, headache, vomiting and diarrhœa, and if the exposure has been for a long time the symptoms may persist even after the cause has been removed. The pulse becomes rapid and feeble, the respirations shallower, with a final loss of consciousness, and progressive damage to organs. In those diseases where anoxæmia is a prominent factor, there is often increased metabolism, as has been shewn in cardiac insufficiency, and in fever.

Barcroft classified his types of anoxæmia under three headings:

1. *Anoxic Type.* The pressure of the arterial blood is too low. The arterial oxygen saturation of the hæmoglobin is below normal, *i.e.*, below 95 per cent. Mountain sickness is an example in which the diminished partial pressure of oxygen in the blood is due to the diminished partial pressure of oxygen in the atmosphere. In œdema of the lungs, the oxygen at prevailing pressures cannot diffuse properly through the diseased alveolar wall, and insufficiently oxygenated blood is passed into the aortic stream, lowering the arterial saturation.

2. *Stagnant Type.* The quantity of oxygen which reaches the tissues in unit of time is less than normal because of a slowed blood flow. More oxygen is used up in the capillaries and the venous blood has a lowered oxygen saturation, below 65 per cent.

3. *Anæmic Type.* A diminished amount of available hæmoglobin is present, which involves a lessened capacity to carry oxygen. This condition may be due to an actual diminution in the number of red blood cells, or the hæmoglobin may be converted into methæmoglobin, or monopolized by a carbon monoxid so that its oxygen-carrying function is destroyed.

As the Boston observers conclude, "The anoxic type is primarily due to pulmonary causes, *i.e.*, faulty oxygenation of blood as it flows through the lungs. The stagnant type is primarily due to cardiac causes, *i.e.*, decreased rate of blood through the systemic capillaries. In cardiac insufficiency, the two frequently occur together, the stagnant type because of poor heart action, the anoxic type because of the secondary conditions of pulmonary congestion and œdema.

The summary of their observations on cardiac insufficiency are succinctly added as follows:—

1. In a normal man, the inhalation of oxygen for one half hour caused an increase in the oxygen saturation of the arterial and venous blood. In a second normal individual, the inhalation of oxygen for the same period caused a very slight rise in the venous saturation, the arterial saturation not being tested. The pulse was slowed in both cases. No significant changes occurred in the blood pressure, vital capacity, electrocardiogram, venous carbon dioxid content, or rate of respiration.

2. In seven cases of cardiac insufficiency, an anoxic (arterial) anoxæmia was present in all, a stagnant (venous) anoxæmia in all except one.

3. Oxygen inhalation regularly increased the arterial saturation. Where the anoxic anoxæmia seemed due to passive congestion and œdema at the bases of the lungs, the arterial saturation was raised to the normal by inhalation of oxygen for one half hour. In the cases complicated by widespread pulmonary œdema relief of arterial anoxæmia was accomplished in from forty-five minutes to two hours.

4. Oxygen inhalation increased the venous saturation in all except one case of auricular fibrillation. The elevation of the venous saturation was largely due to the raising of the arterial saturation. In a few cases, there was an additional and somewhat permanent increase in the venous saturation that seems best explained on the basis of an improved blood flow resulting from the increased supply of oxygen.

5. The arterial anoxæmia of acute and chronic bronchitis, and emphysæma, occurring in cardiac insufficiency, was fully relieved by oxygen inhalation. The venous saturation was correspondingly elevated.

6. The relief of the cyanosis and the slowing of the pulse were the outstanding objective changes. The blood pressure, vital capacity, arterial and venous carbon dioxid content, urinary excretion, and rate of respiration showed no definite changes from short periods of oxygen inhalation. The electrocardiogram showed consistent changes in two cases of right bundle branch block but, no change in one uncomplicated case of auricular fibrillation. Subjectively, the patients usually said they felt more comfortable, or that their breathing was better, but they were rarely enthusiastic."

More interesting still are their observations on the anoxæmia in eleven cases of lobar *pneumonia*, and four patients with broncho-pneumonia. In some cases there was a true arterial anoxæmia, and in one other a stagnant anoxæmia. The most consistent changes in the clinical condition of the patient were the clearing of the cyanosis, and the slowing of the pulse. The respiratory rate was sometimes slowed, and the mental condition often improved. The dyspnœa, however, was not relieved. The effect of a single administration was as a rule temporary, while repeated and prolonged administration produced persistent beneficial changes in the oxygen saturation of the blood, in the pulse, the breathing, colour, comfort and mental condition. Where an acute oxygen want followed the development of pulmonary œdema, the prolonged administration of oxygen gave striking clinical improvement, and seemed to avert the fatal outcome. It is believed that oxygen therapy is a rational rule in the treatment of pneumonia, and that by their technique an effective method has been developed.

The technique of oxygen administration has until recently been most unsatisfactory, both from the point of view of dosage and of coordinated results. Haldane's face mask, and Ryle's nasal catheter, and Hill's oxygen bed tent, indicated the lines along which improvement was attempted. In the method of administration two factors were considered, first, to obtain an effective oxygen mixture, and secondly, that oxygen itself should not be given for too long a period. In any case it would seem that mixtures under 70 per cent. oxygen could be breathed indefinitely without harmful effect.

Barach and Woodwell in their investigations obtained most satisfactory results from the use of the soft rubber mouthpiece, as employed with the Benedict respiration apparatus. It fits easily into the mouth, has a sufficiently wide opening for all respiratory excretions, and there is no leakage. The patient is asked to breathe through the mouth, and in the process it was found he breathed from four to seven parts of oxygen through his mouth, and from three to six parts of air through his nose. This mouth-piece was connected with a soda-lime canister, which, in turn, was attached to a rebreathing bag, and this in turn to an oxygen tank. By this means the patient rebreathed pure oxygen, for the carbon dioxid was re-absorbed by the soda-lime. It was found that patients took the mouth-piece well, that the breathing was satisfactory, and involved no burden.

Another feature of great interest in connection with these investigations is the observations that have been made upon uneven ventilation of the lungs resulting from shallow breathing, and consequent anoxæmia. For these observations patients with lethargic encephalitis were examined. In these patients there was an extreme type of shallow breathing, with deep cyanosis and coma. The arterial blood was markedly deficient in oxygen, and contained an excess of carbon dioxide.

The inhalation of oxygen greatly relieved the arterial anoxæmia, but had no effect upon the steady accumulation of carbon dioxide. While the circulation was strikingly improved in the beginning, as the result of the relief of the anoxæmia, later on progressive cardiac failure occurred, apparently related to the carbon dioxide retention.

It seemed probable to these observers that a terminal involvement of the respiratory centre in lethargic encephalitis is, at times, the cause of death.

ON THE LOWERING OF BODY RESISTANCE FOLLOWING EXPOSURE TO COLD

THE belief has long been held by clinicians and investigators that when the surface of the body is chilled certain of the internal organs, particularly the respiratory organs, become more susceptible to bacterial invasion. A few, however, believe that exposure to lowered temperature, of and by itself, may be an effectual cause of disease without the intermediation of bacteria. To assist in the further elucidation of this matter a careful series of experiments in which animals were subjected to sudden and severe lowered temperature for varying periods of time has been carried out by Lewis B. Bibb of the U.S. Army, and the effects produced in the various organs of the body have been carefully noted (*Am. Jour. Med. Sci.*, August, 1921). In these experiments rabbits were subjected to generalized cold in the form of an ice bath 1° C., and localized cold produced by the application of CO2 snow. During and after the application blood pressure tracings were taken, blood counts were made and the urine was examined at regular intervals. The animals were killed either immediately after the bath, or at definite intervals, and careful autopsies were made. The outstanding fact pervading the results as observed by them was the intensity of the vasomotor reactions set up by the ice bath and their universal distribution over the body. Small hæmorrhages were found in the tissues of many organs, but were especially numerous in the lungs and stomach. Blood distribution was found altered in the lungs, skin, tracheal mucosa, stomach, spleen, and in some cases in the kidneys. A leucopemia followed by a leucocytosis was induced in the peripheral blood. Bibb considers the increased susceptibility to bacterial invasion noted after chilling of the surface of the body as due to the disorganization of the normal defences of the body produced by the vasomotor disturbances.

ANÆSTHESIA IN NOSE AND THROAT WORK

SOME months ago the attention of our readers was called to the first report of a Committee appointed by the section on Laryngology, Otology and Rhinology of the American Medical Association to study the advantages and disadvantages of the various local anæsthetics in use at present in nose and throat work. In a recent number of the *Journal of the American Medical Association*, October 22, 1921, a final report is presented, which will be read with interest by the profession in Canada. Fourteen hundred letters were sent out by the Committee to members of this section of the Association, and three hundred and fifteen replies were received. Twenty-seven deaths were reported in which the local anæsthetic was the direct cause of the fatal issue. Of five no details were obtainable. Of the remaining twenty-two, eleven were from cocain, five from procain and cocain, three from procain only, one from apothesin and cocain, one from apothesin only, and one from alypin and cocain. All of these fatalities have occurred within the last two or three years, and with the exception of three none have been reported in the medical journals. The Committee sum up their report on what they found as follows:

A study of these untoward happenings enable us to reach the following conclusions:

1. Deaths from the administration of local anæsthetics are vastly in excess of the number reported in the medical journals.

2. In most instances convulsions are the first indication of toxic effects; consciousness is never regained and death ensues within a comparatively short time.

3. The customary dosage of local anæsthetics varies from small amounts to very large ones.

4. There is no check on the manufacturer as to the comparative toxicity of the various batches of drugs that are placed on the market.

5. The freedom from ill effects noticed by many who have used these drugs has made the profession oblivious to the presence of danger.

6. The presumption of the Therapeutic Research Committee, that there are many unrecorded deaths, is thoroughly substantiated.

7. The appointment of a suitable commission to investigate further these deaths and take action thereon is vitally necessary.

NATIONAL BOARD OF MEDICAL EXAMINERS IN UNITED STATES

It will be a source of gratification to all recent graduates of our universities in Canada to know that a National Board of Medical Examiners for the United States are prepared to examine and grant a license to practice to such graduates of Canadian Medical Schools rated as Class A who pass this examination. Those who are successful are to be awarded the privilege of practising without further ceremony in most of the States of the American Union. The sub-joined statement from the National Board indicates the nature of the examination. Certainly it is a gratifying piece of news to learn that the restricted conditions that exist in so many of the States of the Union are now to be removed through the agency of one National Board, acting very much in the same capacity as does the Dominion Medical Council for our own country.

The following statement, issued by the National Board, is herewith appended:—

The National Board of Medical Examiners has just completed the first five years' work and with it the trial period of its usefulness. The principle which this Board has stood for, namely, the establishment of a thorough test of fitness to practice medicine and surgery which might safely be accepted throughout this country and abroad, has been widely accepted.

Since this Board was organized by Dr. W. L. Rodman in 1915, eleven examinations have been held. These examinations have been conducted on the plan of holding at one sitting a written, practical and clinical test for candidates possessing proper qualifications., viz., a high school training, two years of college work in arts and science, and graduation from a class A Medical School, together with one year's internship in an acceptable hospital. These examinations have covered all the subjects of the Medical School curriculum and have been conducted by members of the National Board associated with members of the profession resident in the place of examination appointed to help them.

Starting with the endorsement of the Council on Medical Education of the American Medical Association, the American Medical College Association and various sectional medical societies, its certificate is now recognized by the Army, Navy and Public Health Service Medical Corps of the United States and by twenty states in the Union, also by the Conjoint Board of England, the Triple Qualification Board of Scotland, the American College of Surgeons, and the Mayo Foundation of the University of Minnesota.

In order to help the Board the Carnegie Foundation has appropriated $100,000.00 over a period of five years.

REGARDING THERAPEUTIC ADVERTISEMENTS

The Editorial Board of the Journal regrets that through some misunderstanding, reading notices in the October issue, intended only for insertion as advertisements, were allowed to be inserted on pages wholly reserved for reading matter which has been edited by the Board.

We desire to call attention to the advertisement in our current issue of the Purchasing Commission of Canada, who have for disposal Government surplus stores of surgical instruments, appliances etc., and also some medicines. The Government is very anxious to dispose of these stocks, and physicians may find it of advantage to obtain a copy of the list, which will be mailed on request.

Correspondence

Halifax, N.S.,
November 2, 1921.

To the Editor:

If, as you say, in your criticism of my presidential address, I "belittled the study of physics, chemistry and biochemistry," what do you infer from the paragraph beginning with:

"But I would not be misunderstood. Let our universities by all means cover the whole field of medical science, yet I would not add to that the ability to weigh the moon in physics" etc. etc.

To make my meaning clear, let us take an analagous case in medicine: An ataxic patient with sclerosis somewhere along the course of his posterior columns. His muscular power remains good, but he does not know how to use it. He lacks co-ordination. Do I as a clinical teacher belittle muscular power, because I point out its errancy? Lack of co-ordination in medical education due to sclerosis somewhere in the spines of the institutions entrusted with it! That was and is my charge, and I am quite prepared to stand by it.

Nor am I alone in this attitude. Dr. Hugh Cabot must have had some of it, when, in his address published side by side with mine, he said: "Today we are exceedingly dependent upon the results of laboratory investigation . . . It sometimes occurs to me to think that we at times lose our sense of proportion (ataxia pure and simple) and become altogether too dependent upon our laboratory associates, and at times rely too implicitly upon their results."

Frank Kidd, M.B., F.R.C.S., Eng. surgeon to London Hospital, in his book *Common Infections of the Kidney,* which I believe is the most scientific book on the subject in our language, and which I have read since my address, has this to say, p. 165:

"A school of bacteriologists has grown up apart from the wards, who might perhaps call themselves the sterilizing school, but which I would prefer to call the Sterile School. Their observations lead them into a blind alley, when they forget the human being, in their intense study of the bacterium. They develop the *test-tube mind.*" And on p. 199 he says: "It has lately been the fashion to despise clinical medicine, and to deny to clinical observation the blessed title of 'Research.' The future, I believe, lies far more with real clinical research than with pure laboratory research."

Do these men—these great men—belittle the subjects of physics, chemistry, or bacteriology, because they lament and denounce the modern failure to adapt and conform any one of these subjects to sound clinical education? If my long experience in clinical teaching, and my recent observation, has forced me unknowingly into the company of these, and many other such worthies why should you express any regrets about it? We need many things, but none more so than men—men able to adequately co-ordinate the course of instruction so that our students shall not emerge from our hospitals cursing, as I heard them do, "the academic alphabets who robbed them of clinical experience."

Sincerely yours,
M. Chisholm

Obituary

DR. WALTER H. MOOREHOUSE

Dr. Moorehouse died at his residence in London, Ont., on October 24th. He had practised medicine for half a century, and was universally regarded as a capable and conscientious physician known and respected through all the western counties of Ontario. He was born in the county of Lambton, and was graduated in 1874 from the University of Toronto, with the degree of M.B. For a time he did post-graduate work in England, and, returning to Canada, secured the degree of B.A. from the Western University, London. Dr. Moorehouse had been for seventeen years Dean of the Western Medical College, and was for eight years Vice-Chancellor of the University. He was past President of the London Medical Association, the Ontario Medical Association, and the Canadian Medical Association. He had also been a member of the Senate of Huron College, and a warden of St. Paul's Cathedral. He is survived by his wife. J. Hopkins Moorehouse of Winnipeg, a well-known Canadian author, is a nephew.

Abstracts from Current Literature

SURGERY

The Treatment of Joint Tuberculosis.

Ely, Leonard W.: Amer. Jour. Surg., Vol. 35, No. 9.

Attention is first called to the wide divergence of methods used, and ignorance of the pathological condition is suggested in explanation for this divergence.

The writer then notes that "tuberculosis of a joint is the same in its essence as tuberculosis in any other part of the body," and that it is a disease strictly limited to two tissues, lymphoid marrow and synovial membrane. Hence the explanation of the fact that long bones are attacked only in the neighbourhood of a joint, instead of in the shaft.

Hence rules of treatment are:—

1. Deprive the joint of function—in children by conservative methods, and in adults by radical operation.

2. Avoid secondary infection, closing all wounds without drainage. "When we attempt to provide by drainage for the exit of tuberculous material, we really provide for the entrance of pus germs, and often open the door through which death eventually enters."

3. Improve the patient's general condition by rest, good food and fresh air.

4. Cold abscesses, if deep seated, not increasing rapidly in size and not approaching the surface, may be left alone. Otherwise they should be aspirated under the strictest aseptic precautions. In no case are they to be opened or drained.

An opinion is not expressed as to the benefit or otherwise of injecting pus cavities with antiseptics.

5. In excising joints do not attempt to remove all the disease. Simply take away enough bone to destroy the joint.

The author then goes on to discuss the operations advisable in each locality, and concludes by stating that operation is almost invariably the best treatment for a tuberculous spine in patients of all ages, claiming that conservative treatment rarely results in a cure, and almost invariably is accompanied by deformity

This article is clear and concise and is worth reading.

W. J. Patterson

The Simplification of Technique in Operations for Harelip and Cleft Palate.

Thompson, J. E.: Annals Surg., October, 1921, Vol. 74, No. 4.

The author states that whatever be the cause of the failure of the embryonic face fissures to unite, the subsequent deformity is not due to the lack of development of the lateral halves of the palate or the alveolar border, but to the thrust of the muscular tongue distorting these parts if they have failed to unite at the proper time. The alveolar processes are thrust outwards, and the palatal processes upwards. The deformity cannot be overcome by bringing the alveolar margins together as is indicated in Brophy's description of his operation. The measurement of the degree of deformity is made by taking the width of the upper jaw in comparison with the lower at corresponding points. The author insists that a correction of the bony deformity must precede the correction of the lip. He divides his procedure into two, three or even four stages. The first stage consists of the moulding and suturing together of the alveolar borders. This can be done with the fingers up to the age of three months. The lip may then be closed either at once or at the second stage. The third stage is the closure of the palatal cleft. This also may have to be divided into two steps. The work should be completed before the child has learned to talk. The alveolar border and the lip are operated on as early as possible. The closure of the cleft in the palate is deferred till the child is six months old or until even later. A double complete cleft is rarely finally restored before the end of the second year.

F. A. C. Scrimger

Subluxation of the Shoulder Downwards

Cotton, Frederick J.: Boston Med. and Surg. Jour., Vol. 185, No. 141.

The author states that so far he has not found any thing written on this condition, which he describes as due not to a single trauma, but a result of gradual exhaustion of the shoulder muscles, particularly the deltoid. He believes that many cases listed as circumflex nerve paralysis properly belong to this group.

A typical case is described as a result of an uncomplicated fracture of the humerus treated by traction, especially if the muscles are none too strong.

If untreated the condition passes on to one of helplessness and stiffness, not unlike that of subdeltoid bursitis.

Treatment should consist of early massage, and as soon as possible, the exchange of traction for support of the whole arm.

The condition is most likely to occur in the elderly, the stout, and the less vigorous.

W. J. Patterson

The Injection of Oxygen Into Joints for Diagnosis. Kleinburg, S.: Amer. Jour. Surg., Vol. 35, No. 9.

The history of the development of this is reviewed, and several cases are cited from the author's personal experience.

The conclusions drawn are:—

1. The practicability of injecting oxygen in an out-patient department has been demonstrated, at least in non-weight bearing parts.
2. The subdeltoid bursa can be injected and its outlines shown without difficulty or pain.
3. The method has not been successful in outlining loose or injured semi-lunar cartilages in knee joints.
4. The method accentuates the contrasts between soft parts and bony parts, and brings into relief soft parts not seen in ordinary radiograms.
5. It is very useful in demonstrating loose bodies in joints, and invaluable in localizing them.
6. It is helpful in showing the presence and extent of hypertrophied synovial tissues.

W. J. Patterson

Arthroplasty. Putti, V.: Jour. Orthop. Surg., September, 1921.

At the May meeting of the American Orthopædic Association in Boston, Professor Putti outlined his technique in arthroplasty, particularly for bony ankylosis of the knee. He showed moving pictures of the end results, which were excellent. He maintains after ten years' experience that arthroplasty is an interference worthy of the greatest faith and destined to assure a real functional advantage to the patient. He insists however that it must not be lightly undertaken or proposed.

The surgeon should have a notable mastery of technique, and the patient should be willing to undergo much suffering in the post-operative manipulation of the joint. Free fascia flaps are used, the ends of both bones being completely covered.

Professor Putti's end results mark an epoch in the history of arthroplasty.

J. A. Nutter

Arthrodesis of the Sacro-Iliac-Joint—A New Method of Approach. Smith-Peterson, M. N. Jour. Orthop. Surg., August, 1921.

Dr. Smith-Peterson's approach to the hip joint, which has been found so useful, has stimulated him to the perfecting of a similar subperiosteal approach to the sacro-iliac joint.

This article, which is well illustrated, makes his technique plain. A subperiosteal flap is thrown downwards and forwards exposing the posterior part of the bone. A rectangular window is chiseled through this bone and removed en bloc. The sacro-iliac joint is come upon. In cases of tuberculosis and relaxation the cartilage and cortex of the sacrum are removed and the block of bone from the ilium driven part way into the sacrum, thus obtaining bony union.

In purulent affections the window is left open for drainage. The results are stated to be excellent in all three conditions mentioned.

J. A. Nutter

Manipulations of Stiff Joints. Jones, Sir Robert.: Jour. Orthop. Surg., August, 1921, p. 385.

When is a stiff joint to be moved and when is it to be rested? The answer depends on the absence or presence of arthritis. In arthritis a joint should show rigidity in all directions, not in certain directions only. No limitation of joint movement means no arthritis. Joint adhesions are to be avoided by early and safe resort to active and passive motion. In direct injuries to joints unaccompanied by fracture, movement may be given immediately on the cessation of acute symptoms, i.e., when swelling and tension pain have disappeared.

The technique of breaking down of adhesions is described in the case of every joint. Early movements after manipulation are advised. The tearing or feeling of an adhesion rupturing gives a good prognosis, but when the joint yields slowly and gradually the prognosis is not so good.

Subacute arthritis of the shoulder following a fall with outstretched hand is described as due to stubbing the shoulder. The stiff elbow joint, especially in children, often becomes mobile by use, even where passive motion causes a painful reaction. The benefit resulting from manipulating under an anæsthetic a monoarticular osteoarthritis of the hip is noted. The symptoms and treatment of adhesions about the insertion of the ligamentum patellæ of an incompletely reduced semilunar cartilage, and of adhesions between semilunar cartilage and joint capsule, are described most clearly.

In the foot the disability resulting from adhesions is discussed, with the appropriate remedy.

A most instructive and practical article.

J. A. Nutter

MEDICINE

Restoration of the Normal Cardiac Mechanism in Auricular Fibrillation by Quinidin.

Levy, Robert L.: Jour. A.M.A., Vol. 76, May 7, 1921.

Following the earlier work of Wenckebach in 1914 with quinin in auricular fibrillation, Frey in 1918 and subsequently other continental workers used quinidin, a dextrorotatory stereo-isomer of quinin, with somewhat better success.

Levy gives a preliminary report on his results with quinidin in four cases of fibrillation.

With preliminary trial doses of 0.2 to 0.4 gm. of quinidin and subsequent larger doses aggregating 4.8 gm. as the maximum, he has been able to reduce well-established auricular fibrillation to a normal regular rhythm in two of his cases, without any alarming symptoms following its use.

In the two successful cases the transition from one rhythm to the other was by means of a transitory auricular flutter.

The third case changed to auricular flutter, then back to fibrillation. The last patient, beyond a transitory tachycardia, remained in fibrillation.

The determining factor in altering the mechanism of the heart is not clear.

To achieve optimal results it would seem best to administer the maximum dosage, compatible with safety, in as short a period of time as possible.

C. F. Moffatt

Visceroptosis as a Cause of Stomach Trouble.

Reid, W. D.: Boston Med. and Surg. Jour., June 16, 1921.

Medical Aspects of Visceroptosis.

Ebright, California State Jour. Med., June, 1921.

The Interpretation of Gastro-Intestinal Signs and Symptoms.

Rolph, New York State Jour. Med., July, 1921.

These articles on visceroptosis draw our attention to an important subject and remind us of the many forms which it may assume.

Reid says his paper was written to draw attention to the condition, not to point out anything new., as he is continually seeing patients suffering from visceroptosis who have been treated for many other things. He cites several cases; all were women, and all came to him as stomach cases. They were people of poor physical development and as he says "they carried themselves in the posture of fatigue." He made his diagnosis on the history and clinical examination and by the ruling out of organic disease by means of x-rays and laboratory tests.

Ebright recognizes two types, an hereditary and an acquired. The hereditary type, as he pictures it, is familiar to us all; a long flat thorax, unattached ninth and tenth ribs, unstable vasomotor system and a low blood pressure, that is the opposite to the athletic type. The acquired type follows a chronic illness, pregnancy, or a too strenuous reduction of weight.

The treatment of the hereditary type should begin in early life, and last through the school years, and this should be the work of the family physician. For the fully developed condition treatment should be along two lines, the increasing of nutrition, and the correcting of mechanical faults. Stress is laid on the importance of attending to foci of infection, and sources of irritation, as weak ankles and flat feet, and Reid believes the condition should be explained to the patients ,which encourages them, as they usually have been considered lazy or "quitters." Nutrition is increased by avoiding fatigue and taking plenty of good food daily. This food is best taken in small quantities and carbohydrates are better borne than fats. They recommend reclining after meals in positions that prevent drag, such as on the back with a pillow under the hips, or prone with a pillow under the lower abdomen. As regards mechanical support of the organs, bandages or well-fitting corsets may be used, but Ebright advocates the use of suitable exercises combined with massage and hydrotherapy.

Rolph in his paper has endeavoured to link up some of the complaints of gastro-intestinal patients with their causes. He considers a number of them. Hæmorrhage, he thinks, is more often due to a ruptured vein, from congestion the result of spasm, than from ulceration. and pain and tenderness are not the result of mucosal irritation but of the distension of unstriped muscle. Duodenal spasm and hyperperistalsis are the causes of hunger pain. When the stomach is empty a normal duodenal contraction may become a spasm where we have an irritable vagus nerve, and gastric peristalsis then causes pyloric distension and pain. So duodenal ulcer symptoms are the symptoms of duodenal spasm, and these may be caused reflexly from a diseased appendix, gall bladder, throat etc. The ulceration is probably due to spasm and is an accidental happening, and does not give rise to any particular symptoms, except perhaps it increases the local spasm and causes hæmorrhage and peritoneal irritation. Gastro-enterostomy relieves the hunger pain by providing a safety valve and also preventing distension and muscle stretching. R. H. M. Hardisty

Smallpox Vaccination and Pulmonary Tuberculosis. Klotz, Walter C., and Stafford, Frank B., Amer. Rev. of Tuberc., September, 1921, Vol. 5, page 595.

This report is the result of the experience of the authors when faced with the danger of a smallpox epidemic in a sanitarium. There were 133 patients in the sanitarium, of whom 21 had never been vaccinated: all except 20 who were too ill were vaccinated.

All patients were given a routine examination before vaccination, were kept in bed during the active manifestations of vaccinia, and were given a special and careful examination after all evidences of reaction had subsided. In only one of them was there an increase in the number of râles, but this patient had been progressing unfavourably for some time previously: indeed most of them declared that they felt better than before vaccination. In a group of 19 employees the symptoms of vaccinia were as severe as in the patients with active tuberculosis. The stage of the tuberculous process had no effect on the vaccinia. The authors conclude that vaccination is not contra-indicated in tuberculosis and does not exert any unfavourable influence upon it. D. G. Campbell

On the Etiology of Hæmorrhagic Disease of the New Born. Gelston, C.F., Amer. Jour. Dis. of Chil., Vol. 22, No. 4.

The paper is a clear statement of the present-day belief in regard to the etiology and treatment of hæmorrhagic disease in the new born. One case is reported in detail. After a short historical sketch, the author states that the work of Hurwitz and Lucas has placed the subject on a firm physiological basis. They are stated to have proved that the bleeding of hæmophilia is due to the lack of prothrombin, with a consequent disturbance of the prothrombin antithrombin balance. Prothrombin is known to be lacking also in cases of hæmorrhage of the new born, as has been shown by Whipple and others. The treatment in the case reported, and the treatment recommended is the injection of whole blood into the muscle and into the superior longitudinal sinus. In the author's case ten cc. of citrated blood was injected into the buttock, followed by eight cc. into the longitudinal sinus, and one-half hour later thirty-five cc. into the same sinus. The bleeding ceased and did not recur. The coagulation time of the blood changed from seventy minutes to eighteen minutes. It is to be noted that citrated blood was used.

F. A. C. Scrimger

CANADIAN ARMY MEDICAL CORPS

Re-Organization

At the present time, three years after the signing of the Armistice and nearly one year since the closing of the last C.E.F. hospital and the demobilization of its personnel, the work of re-organizing the Militia Medical Service is making good progress. During the transition period from C.E.F. activities to peace-time conditions, when many medical officers upon demobilization were immediately confronted with the serious problem of re-establishment, it was impossible to infuse the same enthusiasm for military associations as during the war. However, since the new establishment of medical units was authorized late in the year 1920, approximately 700 medical officers have been appointed to medical units, or attached as Regimental Medical Officers to non-medical units. This fact, in itself, is proof positive that the spirit of self-sacrifice so markedly displayed by the medical profession during the war still survives, and augurs well for the success of the re-organization of the Canadian Army Medical Corps.

In pre-war days the medical organization of the active militia provided for a certain number of cavalry field ambulances, field ambulances and clearing hospitals, but no provision was made for general hospitals, stationary hospitals, nor for the smaller units which during the war were found to be so necessary. In the new organization provision has been made for a certain number of all medical units which served overseas, and in considering the numbers of these units to be retained in the militia upon re-organization, a definite plan was followed. In locating units, every consideration was given to territorial, university or provincial associations, while in each case the overseas number has been retained. In many of the new militia units the Overseas Commanding Officer has again taken command; in others, officers who were closely identified with the unit overseas still retain their connection. Moreover, in nearly all cases units have been located in areas from which recruits were drawn during the war, thus making it possible to a great extent to continue war associations.

Before and during the war, seniority in the Army Medical Corps was by a corps list. This was possible previous to 1914, but during the war great difficulty was experienced in maintaining relative seniority among the great number of medical officers both overseas and in Canada. In the re-organization, very careful consideration has been given to the matter of seniority among officers, upon being appointed to the Non-Permanent Active Militia. Seniority by a corps list for the whole of Canada was not considered feasible for obvious reasons, and has, therefore, been discontinued. The following scheme of re-organization has been recently authorized, and it is hoped will prove generally satisfactory:

The Medical Service of the Canadian Militia, (Non-Permanent) to consist of:—

(a) The Canadian Army Medical Corps, including the Nursing Services.

(b) Regimental Medical Services, as at present existing.

(a) *Canadian Army Medical Corps*

(1) Regimental lists for C.A.M.C. Units—*i.e.*, each general hospital, cavalry field ambulance, field ambulance or other medical unit, except the sanitary sections which have only one officer, to have a seniority list of its own. The officers to be promoted in their own unit without regard to seniority on the general list, C.A.M.C. The officers to command sanitary sections to be drawn from the general list, C.A.M.C.

(2) General list, C.A.M.C., to include all officers attached to non-medical units as Regimental Medical Officers, and approximately 100 other officers not regimentally employed. This general C.A.M.C. list to have an establishment of, approximately:

Colonels and Lieutenant-Colonels	30
Majors	75
Captains and Lieutenants	195

Officers to be interchangeable between the general and regimental lists.

(3) Corps or Unit Reserves. Each medical unit to have a Corps Reserve, which will be governed by the regulations as laid down

for similar reserves of the cavalry, infantry, etc.

(4) Nursing Services. List of nursing sisters to be published by units in districts.

(b) *Regimental Medical Services.*

The Regimental Medical Services consist of certain medical officers now under 60 in number, who were appointed prior to 1909 to Regiments of Cavalry, Battalions of Infantry, etc., and who are medical officers of their units but do not belong to the C.A.M.C. Officers under this category to be allowed to remain with their present standing, but no new appointments to be made and no more promotions from the rank of Major to the rank of Lieutenant-Colonel, except when the officer is placed on the reserve of officers, C.M., in accordance with Para. 211, K.R. & O., Canada, 1917, and Para. 193, K.R. & O. Canada, 1917.

The scheme of re-organization as outlined above, when applied in appointing officers to the medical units, as well as to the non-medical units as Regimental Medical Officers, will make it possible for nearly 2,000 of the 3,000 Canadian doctors who had service either with the C.A.M.C. or the R.A.M.C. during the war, to continue their associations with the Militia, either on the Active List or on the Reserves of Medical Units.

A complete list of medical units authorized, together with the complement of officers appointed thereto, appears in the Militia Gazette.

RESOLUTION PASSED AT RECENT DOMINION CONVENTION OF AMPUTATIONS

We, the Amputations' Association of the Great War, assembled in their first Annual Convention, this 29th day of September, 1921, on this memorable occasion earnestly desires to express their gratitude and thanks to the various Medical Services with whom we have come in contact, for their perseverance with us, their skill, and above all for the kindness shown to us.

And we also earnestly desire to convey our deep, and sincere regard to the Canadian Red Cross, the Y.M.C.A., the K. of C. Army Huts, the Salvation Army and all other organizations who laboured so much for our comrades and ourselves during the late war to make life a little more cheerful.

And to our comrades, the Nursing Sisters, we wish to express our humble appreciation for so heroically befriending us in time of need:

And to the Governments of Canada, Federal and Provincial and Municipal, we extend our thanks for their deliberations on our behalf.

And to the Churches of all denominations we wish to convey our gratitude for their prayers on our behalf.

And we do earnestly thank the people of Canada for the splendid way they have stood behind us on all occasions, for their unselfish support and their boundless sympathy to us.

News Items

GENERAL

THE tenth International Congress of Otology will meet in Paris in July, 1922, in the week preceding the meeting of the British Medical Association. The Organizing Committee for the British Empire has, as its President Dr. Urban Pritchard, Sir St. Clair Thomson being chairman of the Committee, and Mr. Lionel Colledge (22 Queen Anne Street, London, W.I.) and Mr. J. S. Fraser (Edinburgh) being the Honorary Secretaries. On this Committee Sir James Barrett is the repretentative for Australasia and Dr. H. S. Birkett there presentative for Canada.

The British Committee of Organization has already received no less than 100 adhesions. Those who may not have received a direct invitation are requested to communicate with the Secretary, sending their subscription of ten shillings. All who join the British Committee will be kept informed of details and arrangements for the Congress as they develop. Although the Congress remains in name one of Otology, it will practically embrace both Rhinology and Laryngology.

DR. ROBERT W. POWELL, Registrar of the Medical Council of Canada, announces the results of the October examinations held at Montreal for registration under the Canada Medical Act. The successful candidates, arranged alphabetically, are as follows: E. C. Brown, Montreal; E. M. Busby, Ottawa, Ont.; J. R. Calder, Lachute, Que.; W. J. Cochrane, Victoria, B.C.; E. Craig, North Gower, Ont.; W. L. Crewson, Alexandria, Ont.; C. L. Derick, Noyan, Que.; J. B. Dickie, Truro, N.S.; J. L. Duffy, London, Ont.; W. W. Eakin, Westmount, Que.; A. B. Hawthorne, Westmount, Que.; P. Heinbecker, Listowel, Ont.; S. A. Holling, Ottawa, Ont.; H. S. Hooper, Brownsburg, Que.; W. D. Jamieson, Brantford, Ont.; M. Kaufman, Montreal; D. R. Learoyd, Ottawa, Ont.; J. R. Lockhart, Bristol, N.B.; C. P. McCabe, Pictou, N.S.; L. E. McCaffrey, Ormstown, Que.; S. R. McCreary, Toronto, Ont.; E. A. McCusker, Regina, Sask.; A. M. McGillivray, Dalkeith, Ont.; P. McIntyre, Montague, P.E.I.; H. D. Morse, Halifax, N.S.; V. P. Norman, England; J. W. Palmer, Gagetown, N.B.; W. A. Porter, Yarmouth, N.S.; W. deM. Scriver, Montreal; H. B. Smith, Gloversville, N.Y.; J. W. Towlen, Detroit, U.S.A.; O. C. Trainor, Charlottetown, P.E.I.; H. S. Trefry, Yarmouth, N.S.; J. B. Valentine, Ottawa, Ont.; H. S. Whiting, Westmount, Que.; A. W. Young, Revelstoke, B.C.; M. A. Young, Edmonton, Alta.

NEW BRUNSWICK

UNDER the title of "Prevention," the Department of Health in New Brunswick has issued a small pamphlet in which it proposes to carry on a campaign of education in public health, and to supply such information to the public as may lead them to estimate the great value of preventive medicine.

QUEBEC

ONLY a few years ago it was a rare event when a surgeon from England or the Continent came across to the New World on a voyage of exploration. The current was very much the other way. But now the stream appears to be setting toward this side. Europe visits America and finds much to learn in matters surgical. Montreal and Toronto are finding occasion more and more frequently to welcome distinguished visitors from the othe side. During September Professor de Quervain, the successor to Kocher at Berne University, accompanied by Dr. d'Houbler of the Augustana Hospital, Chicago, included Toronto and Montreal in his tour. Apart from the prime object of his visit, which was to give an address on thyroid surgery at the Philadelphia meeting of the American College of Surgeons, he was collecting ideas for the construction of a new surgical clinic at Berne. With this object in view he visited the Montreal General and the Royal Victoria Hospital, and also the Hotel Dieu, in Montreal, and was afterwards tendered a dinner by the surgeons of these institutions.

ARRANGEMENTS are now under way for the formation of a provincial medical association for the province of Quebec. An inaugural meeting will take place on Monday, December 5th, and it is expected that the first regular meeting will be held some time during the month of January. It is expected that this organization will bring together the French and English members of the profession, and that conjoint clinics will be held in the larger French and English hospitals in Montreal, Quebec, and also under the auspices of some of the county societies.

IN response to requests from some of the graduates in medicine in Montreal, the attending physicians of the Children's Memorial Hospital have arranged to give a series of clinics this winter illustrating the more important subjects in Pediatrics. These clinics will be at least twenty in number and will be held in the Hospital twice a week on Tuesday and Friday afternoons from 5 to 6 p.m., commencing on November 22nd.

ONTARIO

DURING the week of October 30th to November 5th, "National Cancer Week," the American Association for the Control of Cancer had asked the profession in Canada to co-operate in a movement to spread abroad some truths with regard to this nation-wide scourge. In response to their request, the Academy of Medicine, Toronto, arranged that a stated meeting scheduled for February, 1922, should take place during the week. This meeting, the main feature of the week's activities, was addressed by Dr. Alexander Primrose, introducing an outline of the work of the American Association for the Control of Cancer.

Following Dr. Primrose's introduction, the "Progress of Cancer Treatment" was detailed by Dr. Harvey R. Gaylord and Dr. B. F. Schreiner of the New York State Institute for the Study of Malignant Disease.

THE sections of Obstetrics, Gynæcology and Pediatrics held their joint meeting at the Academy on November 3rd.

ON November 7th, Lieut.-Col. Robert McCarrison, F.R.C.P., of the Indian Medical Service, addressed a special meeting of the Academy, the subject being "Recent Investigations Into the Relationship Between Diet and the Condition of the Thyroid Gland."

ON November 8th, the joint meeting of the Sections of Medicine and Pathology took place at the Academy of Medicine, the subject "Encephalitis" was discussed from various standpoints, points, Professor Boyd of the University of Manitoba introducing the pathological and clinical side of the disease. The experimental work as followed in Toronto and the features of the disease as seen in this province were described by Drs. Gordon Cameron and Goldwin Howland.

THE Section of Ophthalmology and Oto-Laryngology met on Monday, November 14th. The report of cases operated on in Toronto and Hamilton by Colonel Smith, I.M.S., was given by Drs. R. J. P. McCullough and P. B. MacFarlane respectively. Modifications of the Indian operation were described by Dr. C. E. Hill.

THE Section of Surgery of the Academy of Medicine met on November 15th.

THE Section of State Medicine of the Academy met on Tuesday, November 29th, at 8.30 p.m. The following programme was presented: 1. Chairman's address, "Health Propaganda." 2. "Health in Industry and its Relation to the Community," J. G. Cunningham (By invitation).

Discussion led by Herbert Baker. 3. "The Value of Quarantine in Communicable Disease," J. J. Middleton. Discussion led by A. Grant Fleming. J. T. Phair, Chairman, Ruggles George, Secretary.

The Chairman of the Ontario Editorial Board wishes to thank the various contributors to the "News Items" column of the *Journal.* It is the hope that in this column will be found in the future details of interest to all the profession, and we are asking for their continued support.

The last meeting for the season of the Northumberland and Durham Medical Society was held in Port Hope, Wednesday, October 26th. Dr. Roscoe R. Graham of Toronto gave a most excellent address on the subject "Chronic Abdominal Disease," which was much appreciated by all the members present. In the evening session Dr. A. S. Tilley of Bowmanville gave an instructive paper on a case of "Osteomyelitis following an injury."

BRITISH COLUMBIA

The British Columbia Medical Association has secured as its executive secretary Mr. C. J. Fletcher who will take office on the first of December. Mr. Fletcher has been with the medical department of the Soldiers' Civil Re-establishment at Vancouver as chief clerk, and should already be well known to a large number of the physicians of British Columbia. It is to be hoped that the organization of the medical profession of British Columbia will shortly be effected, and that it will be possible by means of the *Journal* to furnish news and chronicle the activities of the province.

The Vancouver Medical Association opened the season on October 10th with an address by Dr. R. T. Leiper of the London School of Tropical Medicine on "Helminthology," which was illustrated by lantern slides. The dinner of the Association, regarded as always a superlative function, was held on the evening of November 10th, and maintained the tradition.

The first fortnightly luncheon under the auspices of the Health Bureau of the Board of Trade was held on November 2nd, when Dr. Howard Spohn spoke on "Infant Welfare" and emphasized the importance of certified milk and pre-natal care, the latter involving the determination of the Wassermann reaction as a routine measure in obstetrical cases in hospitals.

In a report from the daily paper a suit against Dr. John Christie of Ocean Falls, B.C., for unstated damages in consequence of an alleged wrong diagnosis was dismissed by Mr. Justice Murphy. The particulars of this suit are not available.

Dr. L. Broe of Anyox, B.C., has removed to Yarrow, B.C., and Dr. Paul Whelan, a graduate of the University of Pennsylvania, has replaced him at Anyox, B.C.

Book Reviews

Parasitologie Humaine. By M. Neveu-Lemaire. Fifth edition, 466 pages, 313 figures. Price 24.50 francs. Published by J. Lamarre, 4, Rue Antoine-Dubois, Paris.

Every Canadian physician should speak French; he should do so if only because that is the language of one-third of the population of Canada. Osler never tired in urging his young men to do some of their reading in a language other than English.

"Parasitology" is an indefinite term. In a medical sense, it usually refers to the study of organisms, other than bacteria, which cause human disease. As their importance in human pathology has become recognized, so has the study of them increased until now the Association of American Medical Colleges recommends that forty hours in the under-graduate course be devoted to parasitology.

There is no book in English exactly like Neveu-

Lemaire's. It is compact yet comprehensive; it contains in a small compass all that a student requires. It is well illustrated. As a rule, although there are exceptions, its conservatism and its conciseness of statement make it a very valuable and safe book for the library of the medical man, and more especially for the working library of a medical student. J. L. T.

PHYSICAL DIAGNOSIS. By W. D. Ross, M.D., Lecturer on Physical Diagnosis and Associate Professor of Medicine in the University of Arkansas. Second edition. Pages 736; 8vo.; 309 illustrations. St. Louis, 1921: C. V. Mosby Co.

The first edition of this book appeared in 1917, It has been revised and largely rewritten, with the addition of many new illustrations. Though treating principally the exploration of the chest and abdomen, there has been included the principal diagnostic signs referable to the head, neck, limbs and nervous system. In the latter we note an outline of the methods used in eliciting the vestibular reactions.

The general text of the work is good, and there is noticeable throughout the book an attempt to correlate the anatomy, pathology and physical signs.

The book is bulky because of the large type and wide spacing, and heavy because of the paper used to secure clearness of the many excellent illustrations. As a consequence it becomes a text and reference book rather than a handbook for students. As such, in spite of its many excellent qualities, it will bear much revision. We can see no reason for the inclusion of roentgenograms of fractures and other surgical conditions in a work which makes no other reference to these conditions. Tophi are defined as concretions of sodium biurate which occur in the joints of the fingers in gouty subjects. Under the heading "enlarged joints" we find but three lines. "Enlargement of the joints of the fingers is seen in connection with gout and chronic rheumatism" is one sentence. The statement that clubbing of the fingers notably accompanies chronic bronchitis, emphysema and phthisis, is not the teaching of most writers in medicine. Though Raynaud's disease receives reference and the fingers are described as bluish-black or livid with gangrene occurring in spots, no mention is made of the more common conditions of blanching of one or more fingers. On page 616 it is said that cyanosis of the lips may be "indicative of regurgitant heart disease." Surely in aortic regurgitation pallor is to be seen rather than cyanosis. Again we find short descriptions of club foot, housemaid's knee and other conditions which are usually considered in the realm of surgery, yet we can find no reference to such an important diagnostic procedure as digital examination of the rectum.

With many good points, the work leaves much to be desired. J. H. E.

TUBERCULOSIS AND HOW TO COMBAT IT. By F.M. POTTENGER, M.D., LL.D. 8vo.; 273 pages. St. Louis: C. V. Mosby Co., 1921. Price $2.00.

This book represents the substance of Pottenger's talks to his Sanatorium patients. It is recognized that success in the treatment of tuberculosis depends greatly upon the co-operation of the patient with the physician, and this can be best secured by instructing the patient both in the nature of the disease and in the measures which have proven of value in treatment and in prevention. It is a splendid addition to the group of books already available to place in the patient's hands. We congratulate the author, who, writing from Southern California, has the frankness to say "There is no specific climate for the treatment of tuberculosis. It can be treated successfully anywhere." J. H. E.

NUTRITION AND CLINICAL DIETETICS. By HERBERT S. CARTER, M.A., M.D., Assistant Professor of Medicine, Columbia University; Paul E. Howe, M.A. Ph.D., Rockefeller Institute for Medical Research and later Officer in Charge of Laboratory of Nutrition Army Medical School, Washington, D.C.; and Howard H. Mason, A.B., M.D., Instructor in Diseases of Children, Columbia University. Second edition, revised. Pages xvi and 703. 1921 Philadelphia and New York: Lea and Febiger. Price $7.50.

In this new edition the subject matter has been brought well up to date. In addition to the authors' own conclusions as to diet, there is included most of the recent work on diet and nutrition, while the standard tables of food values and chemical composition of foods published by Atwater and Bryant, Irving Fisher and Pattee have been incorporated. The subject matter appears in four main divisions.: 1, Foods and Normal Nutrition; 2, a discussion of Foods; 3, Feeding in Infancy and Childhood; 4, Feeding in Disease.

The diet in old age scarcely receives the attention it warrants and diet in the diseases of childhood is given much less attention than we would expect when one of the authors is a pædiatrician.

Without much that is new or original, the book summarizes the literature and our knowledge of dietetics up to 1918 in a comprehensive manner. The Canadian literature has not been overlooked

J. H. E.

A Primer for Diabetic Patients. A Brief Outline of the Principles of Diabetic Treatment, Sample Menus, Recipes and Food Tables By Russell M. Wilder, M.D., May A. Foley, and Daisy Ellithorpe, Dietetians, the Mayo Clinic. 12mo of 76 pages. Philadelphia and London: W. B. Saunders Company, 1921. Cloth, $1.50 net.

This small primer contains outline of the principles underlying the dietary treatment of diabetes, and is suitable for placing in the hands of patients. The urinary tests are given, the dietary plan explained and sample diets given with recipes for special dishes. It is pointed out that the primer is only to be used by patients who are trained and whose carbohydrate tolerance is known.

J. H. E.

McGill's Heroic Past, 1821-1921. By Maude Seymour Abbott, B.A., M.D. 30 pages, 13 illustrations. 1921. Montreal: McGill University Publications. Price $1.00.

This sketch of the foundation of McGill is particularly interesting to the medical profession, in that it gives the story of the foundation of the Montreal Medical Institution, and how it became the Medical Faculty of McGill, the first teaching Faculty, and the first Faculty to grant a degree.

Dr. Abbott has based this historic outline upon researches made in the Canadian Archives, the Sulpician library and elsewhere, by herself and others during the past two decades. The documents, letters and authorities quoted form a storehouse of information relating to the development of the University.

It is another of Dr. Abbott's splendid contributions to Canadian medical history. Published on the occasion of the centenary celebration, it should find an eager audience among both McGill Alumni and all interested in the development of medical education in Canada. The illustrations are excellent and the cover design most attractive.

J. H. E

Books Received

The following books have been received, and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

Diseases of Children. Designed for the Use of Students and Practitioners of Medicine. By Herman B. Sheffield, M.D. 798 pages with 238 illustrations, most original, and nine colour plates. Price $9.00. Publishers: C. V. Mosby Co., 801-809 Metropolitan Bldg., St. Louis, U.S.A., 1921.

Chemical Disinfection and Sterilization. A Collection and Summary of Some of the more important Applications of General Methods which have interested the Authors from time to time. By Samuel Rideal, D.Sc. (Lond.) and Eric K. Rideal, D.Sc. (Lond.), M.A. (Cantab.) 313 pages. Publishers: Edward Arnold & Co., London, Eng., 1921.

The Hot Springs of New Zealand. Written to bring before the notice of the medical profession the value of the Mineral Waters of New Zealand. By Arthur Stanley Herbert, O.B.E., M.D., B.S. (Lond.) 284 pages, with three maps and 87 illustrations. Price 15s. net; also in paper covers, 14s. net. Publishers: H. K. Lewis & Co., Ltd., 28 Gower Place, London, W.C.1., Eng., 1921.

A Pocket Surgery. Summary of the Whole Range of Examination Surgery. By Duncan C. L. Fitzwilliams, C.M.G., M.D., Ch.M., F.R.C.S. (Edin. and Eng.). 348 pages. Price 10s. 6d. net. Publishers: Edward Arnold & Co., 41 and 43 Maddox St., London, W., Eng., 1921.

Operative Dental Surgery. Being the substance of a short course of lectures to the students of the Dental School of Guy's Hospital. By J. B. Parfitt, L.R.C.P., M.R.C.S., L.D.S. 319 pages, illustrated. Price, 21s. net. Publishers: Edward Arnold & Co., London, Eng., 1921.

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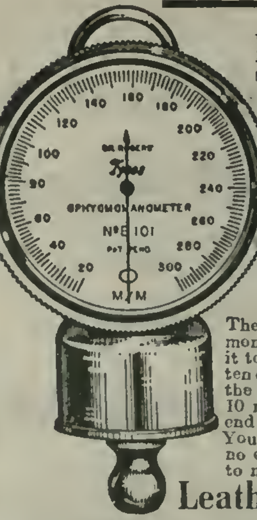

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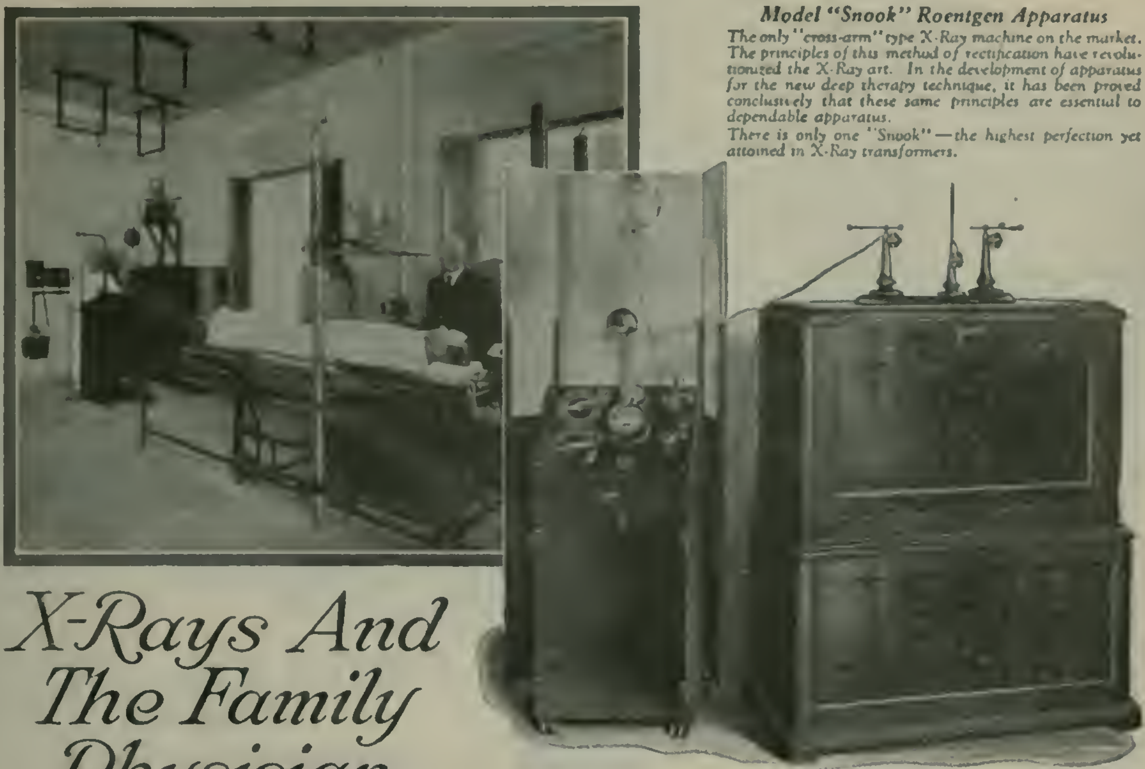

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